

6. SUMMARY OF IMPACTS

Chapter 4 presents the potential environmental impacts of constructing and operating the proposed PFSF on the Reservation. Chapter 5 presents the environmental impacts of constructing and operating new SNF transportation facilities in Skull Valley. This chapter combines the findings of Chapters 4 and 5 and presents the potential environmental impacts from the perspective of the whole project as proposed by PFS. This chapter presents and summarizes the information needed to compare the potential environmental impacts among and between alternatives. A detailed comparison is contained in Chapter 9.

This chapter discusses the following combinations of alternatives from Chapters 4 and 5:

- Alternative 1: PFS's proposed action: Construction and operation of the proposed PFSF at Site A on the Reservation, a new rail siding at Skunk Ridge, and a new rail corridor connecting the Skunk Ridge siding with Site A.
- Alternative 2: Construction and operation of the proposed PFSF at Site B on the Reservation, with the same Skunk Ridge rail siding and rail corridor as described above.
- Alternative 3: Construction and operation of the proposed PFSF at Site A, and construction and operation of a new ITF near Timpie with the use of heavy-haul vehicles to move SNF down Skull Valley Road.
- Alternative 4: Construction and operation of the proposed PFSF at Site B, with the same ITF as described above.

This chapter presents no new analyses not already included in Chapters 4 or 5, with the exceptions of environmental justice and the no-action alternative. Rather, this chapter brings together the analyses from those previous chapters and (in Section 6.1) offers a combined interpretation of the impacts from those chapters. In addition, this chapter presents the cumulative impacts of the entire project (see Section 6.3); provides a project-wide discussion of environmental justice (see Section 6.2); discusses the unavoidable adverse environmental impacts (see Section 6.4), the relation of the short-term uses of the environment and its long-term productivity (see Section 6.5), the irreversible and irretrievable commitment of resources (see Section 6.6) for the whole project; and presents the potential environmental impacts of the no-action alternative (see Section 6.7).

6.1 Impacts of the Proposed Action and Its Alternatives

Table 6.1 summarizes the significance levels of the combined impacts of constructing and operating the proposed PFSF and the proposed new transportation facilities in Skull Valley. A detailed discussion of the entries in Table 6.1 is presented in the following subsections.

6.1.1 Geology, Minerals, and Soils

This section discusses the combined impacts to the soils and economic geologic resources from the combined actions described in Chapters 4 and 5.

Table 6.1. Summary of significance levels of the combined potential impacts for Skull Valley alternatives addressed in this DEIS

Potentially impacted resource or category	Proposed action (i.e., Site A with the rail corridor)	Site B with the rail corridor	Site A with the ITF	Site B with the ITF	
Geology, minerals, and soils	SMALL	SMALL	SMALL	SMALL	
Water resources					
Surface water	SMALL	SMALL	SMALL	SMALL	
Flooding	SMALL TO MODERATE	SMALL TO MODERATE	SMALL	SMALL	
Water use	SMALL	SMALL	SMALL	SMALL	
Groundwater	SMALL	SMALL	SMALL	SMALL	
Air quality	SMALL TO MODERATE	SMALL TO MODERATE	SMALL	SMALL	
Ecological resources					
Vegetation	SMALL	SMALL	SMALL	SMALL	
Wildlife	SMALL	SMALL	SMALL	SMALL	
Wetlands	SMALL	SMALL	SMALL	SMALL	
Perennial and ephemeral streams	SMALL	SMALL	SMALL	SMALL	
Threatened and endangered species	SMALL	SMALL	SMALL	SMALL	
Socioeconomics and community resources					
Human population	SMALL	SMALL	SMALL	SMALL	
Housing	SMALL	SMALL	SMALL	SMALL	
Education	SMALL	SMALL	SMALL	SMALL	
Utilities	SMALL	SMALL	SMALL	SMALL	
Solid and sanitary waste	SMALL	SMALL	SMALL	SMALL	
Traffic	MODERATE TO LARGE	MODERATE TO LARGE	MODERATE TO LARGE	MODERATE TO LARGE	
Economic structure ^a	SMALL TO MODERATE (but beneficial)	SMALL TO MODERATE (but beneficial)	SMALL TO MODERATE (but beneficial)	SMALL TO MODERATE (but beneficial)	
Land use (including rangeland)	SMALL TO MODERATE	SMALL TO MODERATE	SMALL	SMALL	
Cultural resources	SMALL TO MODERATE	SMALL TO MODERATE	SMALL	SMALL	

Table 6.1. Continued

Potentially impacted resource or category	Proposed action (i.e., Site A with the rail corridor)	Site B with the rail corridor	Site A with the ITF	Site B with the ITF
Human health impacts				
Non-radiological risks to workers	SMALL	SMALL	SMALL	SMALL
Radiological doses to the public	SMALL	SMALL	SMALL	SMALL
Radiological doses to workers	SMALL	SMALL	SMALL TO MODERATE	SMALL TO MODERATE
Radiological non-transportation accidents	SMALL	SMALL	SMALL	SMALL
Transportation of SNF	SMALL	SMALL	SMALL	SMALL
Radiological transportation accidents	SMALL	SMALL	SMALL	SMALL
Non-radiological transportation accidents	SMALL	SMALL	SMALL	SMALL
Noise	SMALL	SMALL	SMALL	SMALL
Scenic qualities	MODERATE	MODERATE	MODERATE	MODERATE
Recreation	SMALL	SMALL	SMALL	SMALL
Environmental justice	SMALL	SMALL	SMALL	SMALL

^aEconomic benefits to the Skull Valley Band would be large.

6.1.1.1 Impacts of Alternative 1

Soils and economic geologic resource impacts occur from the construction and operation of the proposed PFSF and the Skunk Ridge rail line. Soils resources used in the soil/cement pad base mixture would be permanently lost; however, they constitute only a small percentage of the similar available soils in the valley. The remainder of soils are used in project construction as slope or embankment dressing, and these soils are recoverable upon facility decommissioning. No excess soils would be generated that require off-site shipment or disposal.

Economic geologic resources (e.g. aggregate) would be required for construction, and sufficient material is available locally to meet these needs. Like the soils resource, aggregate materials used in construction are recoverable upon facility decommissioning and are not lost. Other economic geologic resources (such as minerals or oil and gas) would be unavailable for exploitation during facility construction and operation. However, similar minerals are widely available elsewhere in the region.

In summary, impacts of the proposed action on the soils and economic geologic resources is small.

6.1.1.2 Impacts of Alternative 2

The impacts on the soils and economic geologic resources from Alternative 2 are similar to those from Alternative 1.

6.1.1.3 Impacts of Alternative 3

Soils and economic geologic resource impacts occur from the construction and operation of the proposed PFSF and the ITF. Soils and economic resource impacts for the proposed PFSF are the same as those in the proposed action. Fewer mineral resources would be required for construction of the ITF than the new rail line. However, since these materials are readily available locally and can be recovered at decommissioning, the impacts of this alternative are not significantly different than those associated with the proposed action.

6.1.1.4 Impacts of Alternative 4

Soils and economic geologic resource impacts for this alternative are similar to those of using Site A with the ITF.

6.1.2 Water Resources

6.1.2.1 Impacts of Alternative 1

Surface water. Construction and operation of the proposed PFSF with the new rail line and the proposed access road would have small impacts on surface water hydrology. Under extreme flooding conditions during construction, small to moderate impacts could result from soil erosion and sedimentation of surface water channels. No adverse impacts on surface water quality are anticipated.

The proposed PFSF design includes earthen berms to protect the fuel storage pads and related facilities from flooding up to and including the PMF. The access road and rail line would cross channels that carry ephemeral flows during wet seasons and would also carry surface water flow during floods. All drainage features under access route embankments, including the access road and the rail line, are designed to carry flood water volumes that would occur during the 100-year storm event. Some portions of the access road and rail line would be inundated by as much as 1 m (3 ft) of floodwater during a flood of PMF severity. The presence of the PFSF and its access routes would not increase downstream flooding potential. During extreme flooding some temporary water ponding would likely occur upstream of the access road and railroad culverts within the floodways associated with surface runoff channels.

Potential impacts related to surface water hydrology include minor localized channel alterations that would be caused by the presence and functioning of flood control berms at the proposed PFSF, and embankments and culverts associated with the site access road and the rail line. Ephemeral surface runoff in the dry washes upslope of the facility would be re-routed around the facility. Channel modifications along access routes would be minimized by use of energy dissipating structures and materials at culvert inlets and outlets; however, some changes in channel morphology and sediment

distribution would likely occur within short distances upstream and downstream of channel crossings.

Groundwater. Small impacts to groundwater availability or groundwater quality could occur as a result of construction and operation of the PFSF and the rail line access.

Groundwater from wells at or near the site would be used for human consumption at the site and to provide water to the concrete batch plant at the site. The estimated peak groundwater use rate during construction would be about 20 to 40 L/min (5 to 10 gal/min). One or more wells on site would be required to provide the required groundwater volume. There is uncertainty as to the adequacy of the aquifer at the site to produce the required quantity of water required for facility construction and operation; however, PFS has identified an alternate water supply, if required. Use of groundwater from the site at the estimated rate would not be expected to impact other existing groundwater users in Skull Valley.

To fulfill project construction water requirements, water would be acquired from offsite sources and transported to the site and access routes for use in dust control, soil compaction, and mixing of soil cement for the storage pad foundations. Water of sufficient quantity and quality is commercially available within trucking distance of the construction areas. Approximately 242,266 m³ (64 million gallons) of water would be required for rail line construction, and approximately 60,567 m³ (16 million gallons) for Phase 1 construction of the site.

No activities or processes would occur at the proposed PFSF that would adversely impact groundwater quality. Stormwater runoff from the SNF storage pads and process areas, which is not expected to contain contaminants, would flow into a surface water detention basin where percolation into site soils and evaporation would occur. The facility would have two septic tanks with leach fields. Assuming that BMPs would be used in the event of leaks or spills of vehicle fuels, there would be no potential for petroleum contamination of groundwater.

6.1.2.2 Impacts of Alternative 2

The hydrological impacts of using Site B in Skull Valley with the rail line are expected to be small and would be similar to using Site A with the rail line, since Site B and Site A are directly adjacent to one another, and the site soils, surface water, and groundwater characteristics are similar.

6.1.2.3 Impacts of Alternative 3

The hydrological impacts for the option of constructing the ITF and using Skull Valley Road would be small, as discussed below.

Surface water. Potential surface water impacts using Site A with the ITF and heavy haul truck transport of the SNF shipping casks would have small impact on surface water features. There is no potential for flooding at the ITF site. Construction of the ITF would require approximately 22,000 m³ (5.6 million gallons) of water for earthwork and cement.

Groundwater. There would be no significant differences in groundwater use if the ITF were used rather than the rail line. There would be a somewhat smaller potential for construction-related leaks or spills of vehicle fuel if the ITF and Skull Valley road were used rather than the proposed rail line

corridor. Use of Skull Valley Road for fuel cask transport would slightly increase the possibility of vehicle accidents resulting in spills that could impact surface water or groundwater quality.

6.1.2.4 Impacts of Alternative 4

The hydrological impacts of using Site B in Skull Valley with the ITF are expected to be small and would be similar to using Site A with the ITF, since Site B and Site A are directly adjacent to one another, and the site soils, surface water, and groundwater characteristics are similar.

6.1.3 Air Quality

6.1.3.1 Impacts of Alternative 1

As discussed below, the temporary and localized effects of construction could produce occasional and localized moderate impacts on air quality in the immediate vicinity of the construction activity along the proposed rail line and small impacts elsewhere. Air quality impacts of operation would be small.

Analysis using the EPA air dispersion model ISCST3 (EPA 1995), discussed in Section 4.3, indicates that air quality impacts would be largely confined to an area well within 3 km (2 miles) of any construction activities, and within much lesser distances with routine mitigation of fugitive dust. Because of the large distance between the proposed storage facility and most of the related rail line, natural air dispersion processes would greatly dilute any pollution plume arising from rail line construction before it could mix with pollutants from the proposed PFSF, and vice-versa; therefore, impacts would not be additive except when that portion of the rail line adjacent to the storage site is under construction. That case was considered in the modeling of site construction in Section 4.3, where some rail line construction was included. The impacts from construction of the rail line are described in Section 5.3. Other effects would not be additive.

Combined effects of operation would be dominated by pollutant products of the fossil fuel combustion to power locomotives. Air quality impacts of the switchyard locomotive and other vehicles and equipment used during operation would be small.

6.1.3.2 Impacts of Alternative 2

The impacts of Site B and the rail line would be difficult to distinguish from those for Site A with rail transport and would therefore be small to moderate. Construction would have to include about 3 percent more rail line; and proportionally more pollutants would be generated each time a locomotive used the line.

6.1.3.3 Impacts of Alternative 3

As in the case of rail transport, the distance between the ITF and the storage facility precludes any appreciable combined effects of pollution from both sources, for both construction and operation of the proposed facility. Thus, the combined effects are small. Road construction adjacent to the storage facility was included in the modeling of fugitive dust from construction in Section 4.3, and has therefore been considered as a part of the storage facility construction. Because the ITF would obviate the need to construct a rail line, a large amount of rail line construction would be eliminated if

this combination of options were chosen, and much less construction-related dust would reach Interstate 80. Air emissions from cask-transport vehicles would be similar to those of locomotives under the rail-line alternatives.

6.1.3.4 Impacts of Alternative 4

The impacts of Site B with the ITF would be similar to those for Site A with an ITF facility, and would be small.

6.1.4 Ecological Resources

6.1.4.1 Impacts of Alternative 1

Vegetation. Combined direct impacts on vegetation of the construction of the proposed PFSF and a rail corridor and siding to the site would involve clearing approximately 408 ha (1,008 acres) of land (Table 2.4), covered primarily by degraded desert shrub/saltbush vegetation with a high proportion of non-native cheatgrass. About 29 percent [120 ha (295 acres)] of this cleared area would be occupied for the life of the project by buildings, the cask storage pads, the access road, the rail corridor and siding, and other ancillary facilities. The remaining 71 percent [288 ha (713 acres)] of the cleared area would be revegetated, either with native species or crested wheatgrass. Because (1) the total area cleared amounts to less than 0.4 percent of the land area of Skull Valley, (2) the existing vegetation is already heavily disturbed and dominated in many areas by non-native species, (3) no unique or sensitive areas of vegetation are known to occur in the vicinity of the proposed project, and (4) substantial portions of the areas cleared would be replanted with either native species or a perennial grass, the impacts on vegetation are considered to be small.

Potential indirect effects of fugitive dust from construction of the proposed PFSF and rail line on vegetation are expected to be small because dust control measures would be used throughout the construction period, and the existing vegetation in this type of environment is not sensitive to such emissions.

Direct and indirect impacts of operation of the proposed facility on vegetation would be small. During operation of the proposed facility, no additional disturbance of soils or vegetation would occur beyond that already discussed for construction; hence no additional impacts from the disturbance of soils or vegetation should occur. Other potential impacts include additional wildfires from equipment sparking as has been reported to occur elsewhere in the west (AmeriScan 1999). No other indirect impacts to vegetation are anticipated from operation of the proposed PFSF and rail line because atmospheric emissions are expected to be minor and groundwater withdrawal at the facility would be below the rooting zone of plants.

Wildlife. As discussed above, the combined construction activities for the proposed PFSF and rail line would disturb approximately 408 ha (1,008 acres) of desert shrub/saltbush wildlife habitat. This disturbance would reduce habitats for wildlife species such as jack rabbits, small mammals, and birds. Certain species such as mule deer and pronghorn antelope might be forced to change their movement patterns due to the installation of fencing around the proposed PFSF and the elevated rail bed along the Skunk Ridge rail corridor.

During construction, wildlife, such as ground squirrels, kangaroo mice, pocket gophers, and small reptiles could be displaced or lost due to the excavation of soils. There would be a loss of nest sites for certain species of birds and burrow sites for species such as gophers and burrowing owl. This reduction of animals and wildlife habitat would have a small negative impact on the abundance of prey for predatory species, such as hawks, eagles, owls, and fox species. However, the loss of wildlife habitat due to clearing is expected to have only a small adverse impact because less than 0.4 percent of existing Skull Valley habitat would be disturbed by the combined construction activities of the proposed facility and rail line.

As noted above, there are no permanent streams on the site of the proposed PFSF, and the proposed Skunk Ridge rail line would cross 32 ephemeral streams (Section 2.1.1.3). These seasonally wet areas are important to many wildlife species, including pronghorn antelope and mule deer. Following BLM and STB BMPs would be expected to result in only small impacts to these streams.

The operation of the proposed PFSF project would result in a number of potential impacts to wildlife. Roaming animals may need to adjust their movements and migration patterns from time to time due to the increased traffic in the area. The Skunk Ridge rail corridor would bisect areas between the western side of Skull Valley and the Cedar Mountains, and potentially affect the movement of wildlife across this area. While both pronghorn antelope and mule deer use these areas for habitat during winter, no critical wintering or fawning areas for these species are known to occur along this route. Impacts of the rail corridor on movement of wildlife are expected to be small, however, assuming BLM guidance is followed to provide adequate crossings of the rail line.

During operation, wildlife could be attracted to the casks, buildings, landscaping plants and trees, power lines and poles, and light posts of the proposed PFSF. Birds, mammals, and reptiles may be attracted to the cask storage area in the winter, as this area will be warmer than the ambient air. Birds may use the proposed PFSF structures, such as the storage casks, for perching and potential nesting because of the limited perching and nesting sites now available in the vicinity of the proposed site. Although perching or nesting on or in the immediate vicinity of the storage casks could result in exposure of birds and small mammals to radiation (Section 4.4.2), given the radiation doses at the surface of the casks and implementation of appropriate mitigation, including a rigorous monitoring plan to discourage animals from remaining in the vicinity of the casks for any significant period should result in only small impacts to wildlife populations.

The possibility of increased fire frequency resulting from operation of the rail line could result in some increased mortality for wildlife species that are not very mobile (i.e., small mammals and certain nesting birds). As discussed in the previous section, planting of crested wheatgrass and native species along the rail corridor would reduce the frequency of fires, and thus reduce any impacts on susceptible wildlife species. Because the frequency of wildfires is not expected to increase significantly above current levels, the impacts to small mammals and those species dependent on small mammal prey species are expected to be small.

Wetlands. The impacts to wetlands from construction of the proposed PFSF are anticipated to be small because there are no wetlands on or near the proposed PFSF or in the vicinity of the rail line and siding. The only potential impact to wetlands would be from increased recreational use of the area in the northern part of Skull Valley around Horseshoe Springs, and it should be small.

Perennial and ephemeral streams. Construction of the proposed PFSF and rail line would have only a small impact on streams. Because there are no surface water flows in the vicinity of the proposed PFSF, no impacts to streams would occur. The proposed Skunk Ridge rail corridor would cross 32 ephemeral streams (Section 2.1.1.3). Depending upon the time of year that rail construction occurs, disturbed soils entrained by these ephemeral desert washes could create minor short-term increases in the turbidity of any water in such streams. However, these impacts on streams are expected to be small because best management practices would be used to control and limit soil erosion during construction.

Threatened and endangered species and other species of concern. No Federally listed or State-listed threatened or endangered plant species are known to be present in the vicinity of the proposed PFSF, rail line, and rail siding. Pohl's milkvetch, a State species of concern, could be present in the area of the Hickman Knolls Pit located about 9.5 km (6 miles) west of the proposed PFSF site. Pohl's milkvetch has been threatened by wildfires and cheatgrass expansions within the greasewood communities in Skull Valley (BLM 1998c). Thus, if wildfires are suppressed near the proposed PFSF, there could be a small positive impact on this species.

Potential impacts to threatened, endangered, and other wildlife species of special concern from the construction and operation of the proposed PFSF include loss of habitat and wildlife species being potentially exposed to radiation. Many raptors potentially present in Skull Valley are State or Federally listed. Another listed predatory bird, the loggerhead shrike, is also found in Skull Valley. Construction activities along the rail corridor could disturb or destroy nesting habitat important to these species. With appropriate mitigation measures (i.e., surveys prior to construction), however, impacts to these species could be avoided or minimized and are thus predicted to be small.

Habitat for mammals, including the BLM-listed kit fox, would be reduced by construction of the Skunk Ridge rail line. This species might also be displaced or forced to change movement or migration patterns. Since the amount of habitat is a very low percentage of the available habitat in Skull Valley, impacts to this fox are predicted to be small. Skull Valley pocket gophers could also be displaced or destroyed as a result of the construction of the rail line. With the implementation of surveys prior to construction, anticipated impacts to these gophers could be avoided or minimized, and would thus be small.

6.1.4.2 Impacts of Alternative 2

Direct and indirect impacts to vegetation from constructing and operating the proposed PFSF at Site B on the Reservation along with the proposed Skunk Ridge rail corridor and rail siding at Low would be similar to those for the proposed action. The Skunk Ridge rail corridor to Site B would require an additional 10 ha (24 acres) of land. Thus, the total area of vegetation that would be cleared under this alternative would be about 418 ha (1,032 acres). This area of disturbance is small relative to the total land area of Skull Valley. About 71 percent of the disturbed area would be revegetated after construction. The type and quality of existing vegetation at Site B and the additional area that would be used for the rail corridor is similar to that at Site A, and no unique or sensitive species or plant communities are known to be present. The impacts to vegetation from this alternative are, therefore, considered to be small.

Impacts to wildlife from constructing and operating the proposed facility at Site B with the rail transportation option would be small because the site and additional area needed for the rail corridor

are essentially the same type of habitat as is present on Site A. Because of the longer rail corridor, an additional 10 ha (24 acres) of wildlife habitat would be lost, but there is no unique or sensitive wildlife habitat known to be present on Site B or the additional area needed for the rail corridor. Thus, the impact of this alternative on wildlife is expected to be small.

There are no wetlands, perennial or ephemeral streams, or threatened or endangered plant or animal species known to be present on Site B. Use of the site and area by threatened and endangered species, or species of concern would be similar to use of Site A, and impacts are anticipated to be small with implementation of required mitigation.

6.1.4.3 Impacts of Alternative 3

Impacts of constructing and operating the proposed PFSF at Site A and an ITF near Timpie, and using heavy-haul vehicles to transport SNF from the rail line to the site would be small. Less clearing of vegetation and wildlife habitat would be needed since no rail corridor would be built and existing roads would be used. Therefore, impacts for Alternative 3 would be less than those for Alternative 1. Only 98.5 ha (243 acres) of vegetation and wildlife habitat would be cleared, and about 38 percent [37 ha (92 acres)] of the cleared area would be revegetated. Impacts of constructing and operating the proposed PFSF at Site A on vegetation, wildlife, endangered and threatened species, wetlands, and streams would be identical to those for the proposed action and would be small with implementation of recommended mitigation measures. Under this alternative, the amount of disturbed habitat would be reduced to less than 0.1 percent of land in Skull Valley.

Impacts of constructing and operating the ITF near Timpie would also be small because the 4.5-ha (11-acre) site is already disturbed and does not support any known unique or sensitive vegetation or wildlife habitat. None of the area to be cleared at the ITF near Timpie [4.5 ha (11 acres)] would be revegetated. Construction of the ITF near Timpie is expected to have only a small impact on vegetation because only 4.5 ha (11 acres) would be affected and this area is already disturbed. There are no wetlands or perennial or ephemeral streams near the proposed ITF near Timpie site. No plant species of special concern are known to occur in the area of the ITF near Timpie. The State-listed endangered peregrine falcon is known to have nested a few miles to the east of the ITF near Timpie at the Timpie Springs Waterfowl Management Area, but it is unlikely that these birds use the proposed Timpie site or would be disturbed by construction and operation of the ITF. Thus construction and operation of the ITF would at most cause only a small impact to ecological resources at the proposed ITF or in its immediate vicinity.

6.1.4.4 Impacts of Alternative 4

Constructing and operating the proposed facility at Site B and an ITF near Timpie and using heavy-haul vehicles for transporting SNF from the rail line to the site would have impacts on ecological resources similar to those described for the use of Site A with the ITF because the vegetation and wildlife habitat at Site B are essentially the same as for Site A. Thus, the impacts on ecological resources are anticipated to be small with recommended mitigation measures.

6.1.5 Socioeconomic and Community Resources

As described in Sections 4.5 and 5.5, impacts to the socioeconomic and community resources of the Skull Valley Band and their Reservation are indistinguishable from those to the remainder of Tooele

County with the exceptions of population, land use, and economic structure. Impacts specific to the Skull Valley Band, as compared to the remainder of Tooele County, are noted in the following discussion as appropriate.

6.1.5.1 Impacts of Alternative 1

Population. The effects of the proposed action on population would be small. As demonstrated in Sections 4.5 (construction and operation of the proposed facility at Site A) and 5.5 (construction and use of the rail line), the total increase in population would amount to approximately 0.6 percent of Tooele County's 1996 population during construction and less than that during operations.

Housing. The effects of the proposed action on housing are small. As demonstrated in Sections 4.5 (construction and operation of the proposed facility at Site A) and 5.5 (construction and use of the rail line), the total increase in housing requirements would amount to approximately 26 percent of vacant housing units for sale or rent in 1990 for Tooele County during construction and approximately one-half that proportion during operations. Even if all in-moving workers decided to locate in a single community, which is highly unlikely, the existing housing market is likely to be able to accommodate the demand.

Education. The effects of the proposed action on education are small. As demonstrated in Sections 4.5 (construction and operation of the proposed facility at Site A) and 5.5 (construction and use of the rail line), the total increase in school-age children would amount to approximately 0.5 percent of existing enrollment in 1997 for Tooele County during construction and somewhat less than that during operations. This increase would not place a substantial burden on the local school system.

Utilities. The effects of the proposed action on utilities are small. There may be some improvement to electrical service if upgrades are required for the proposed facility. The small number of in-moving workers would likely live in existing housing that would not require additional utility hookups during construction and operations.

Solid and sanitary waste. The effects of the proposed action on the management of solid wastes are small. The actual quantities of solid wastes expected to be generated would be small during both construction and operation of the proposed PFSF site and rail line and would be shipped to licensed landfills or to permitted low-level waste facilities, as appropriate. Spoils resulting from construction of the proposed facility and the proposed rail line would be reapplied for grading purposes, and vegetative wastes along the proposed rail line would be shredded and scattered in place.

Transportation and traffic. The temporary effects of the proposed action on transportation are moderate to large. The period of greatest traffic impact would occur during the first period of the first phase of constructing the proposed facility (the first 6 to 8 weeks), when traffic delays along Skull Valley Road may result due to a 172 percent increase in use of the road for the movement of construction materials and workers. The contribution to adverse transportation impacts resulting from construction of the proposed rail siding and rail line would be minimal (accounting for only a 4.5 percent increase in traffic along Interstate 80) and would be spatially separate from impacts along Skull Valley Road. Consideration should be given to the avoidance or amelioration of these impacts by appropriate scheduling of the proposed PFSF related traffic. Impacts during operation of the proposed PFSF and use of the rail line for the movement of SNF would be substantially less.

Land use. The effects of the proposed action on land use are small to moderate. Impacts to land use for construction of the proposed facility would be expected to be quantitatively small (since a small proportion of the total land of the Reservation and an even smaller proportion of land within Skull Valley would be altered), even if the change would be qualitatively different. Construction of the proposed rail line, however, could result in reduced availability of grazing resources, including access to livestock watering resources, during both construction and more particularly during operation. Impacts to land use are not considered to be additive for the proposed facility and the proposed rail line since they are geographically distinct. The indirect impacts (i.e., the impacts generated by in-moving workers) of both the proposed facility and the proposed rail line construction and use would be expected to be small.

Economic structure. The effects of the proposed action on the local economic structure would be beneficial and small to moderate in magnitude. Constructing the proposed PFSF and the proposed rail line would directly result in approximately 255 jobs during the peak of construction, and many of these jobs are likely to be filled by workers from Tooele County or from other counties within commuting distance. The peak construction period may last only a few months, at which point fewer workers would be required. The labor market available in Tooele County and other counties within commuting distance is capable of supplying most if not all of these positions.

In addition to jobs, it is expected that construction and operation of the proposed facility would result in increased business for the Pony Express Convenience Store on the Reservation and for other businesses and suppliers in the area. Also, there would be a large benefit to the Skull Valley Band in the form of lease payments for the duration of the proposed facility's operation.

6.1.5.2 Impacts of Alternative 2

Because Site B is very close to Site A, there would be no discernible differences in the anticipated impacts to socioeconomic and community resources during construction and operation of the proposed PFSF if it were to be located at Site B. Similarly, the impacts due to construction and operation or use of the proposed rail line would be identical to those described above for the proposed action. Consequently, the combined impacts to socioeconomic and community resources for this alternative are considered similar, if not identical, to those identified for the proposed action.

6.1.5.3 Impacts of Alternative 3

Population. The combined effects of constructing and operating the proposed PFSF at the preferred site (Site A) and constructing and operating the ITF and transporting SNF to the proposed facility at Site A by heavy-haul tractor trailer along Skull Valley Road on population are small. As demonstrated in Sections 4.5 (construction and operation of the proposed facility at Site A) and 5.5 (construction and use of the ITF/heavy-haul local transportation option), the total increase in population would amount to approximately 0.4 percent of Tooele County's 1996 population during construction and less than that during operations.

Housing. The combined effects of constructing and operating the proposed PFSF at the preferred site (Site A) and constructing and operating the ITF and transporting SNF to the proposed PFSF at Site A by heavy-haul tractor trailer along Skull Valley Road on housing are small. As demonstrated in Sections 4.5 (construction and operation of the proposed facility at Site A) and 5.5 (construction and use of the ITF/heavy-haul local transportation option), the total increase in housing requirements

would amount to approximately 17.2 percent of vacant housing units for sale or rent in 1990 for Tooele County during construction and approximately three-fourths that proportion during operations. Even if all in-moving workers decided to locate in a single community, which is highly unlikely, the existing housing market is likely to be able to accommodate the demand.

Education. The combined effects of constructing and operating the proposed PFSF at the preferred site (Site A) and constructing and operating the ITF and transporting SNF to the proposed facility at Site A by heavy-haul tractor trailer along Skull Valley Road on education are small. As demonstrated in Sections 4.5 (construction and operation of the proposed facility at Site A) and 5.5 (construction and use of the ITF/heavy-haul local transportation option), the total increase in school-age children would amount to approximately 0.3 percent of existing enrollment in 1997 for Tooele County during construction and somewhat less than that during operations. This increase would not place a substantial burden on the local school system.

Utilities. The combined effects of constructing and operating the proposed PFSF at the preferred site (Site A) and constructing and operating the ITF and transporting SNF to the proposed facility at Site A by heavy-haul tractor trailer along Skull Valley Road on utilities are small. There may be some improvement to electrical service if upgrades are required for the proposed facility. The small number of in-moving workers would likely live in existing housing that would not require additional utility hookups during construction and operations.

Solid and sanitary waste. The combined effects of constructing and operating the proposed PFSF at Site A and constructing and operating the ITF and transporting SNF to the proposed PFSF at Site A by heavy-haul tractor trailer along Skull Valley Road on the management of solid wastes are small. The actual quantities of solid wastes expected to be generated would be small during both construction and operation of the proposed site and would be shipped to licensed landfills or to permitted low-level waste facilities, as appropriate. Spoils resulting from construction of the proposed PFSF and the ITF would be reapplied for grading purposes.

Transportation. The combined effects of constructing and operating the proposed PFSF at the proposed site (Site A) and constructing and operating the ITF and transporting SNF to the proposed PFSF at Site A by heavy-haul tractor trailer along Skull Valley Road on transportation are moderate to large. The period of greatest traffic impact would occur during the first period of the first phase of constructing the proposed facility (the first 6 to 8 weeks), when traffic delays along Skull Valley Road may result due to a 172 percent increase in use of the road for the movement of construction materials and workers. The contribution to adverse transportation impacts resulting from construction of the ITF would be minimal (accounting for only a 1.2 percent increase in traffic along Interstate 80) and would largely be spatially separate from impacts along Skull Valley Road. Impacts during operation of the proposed PFSF and use of the ITF and Skull Valley Road for the movement of SNF would be substantially less than during construction, although traffic delays may result along Skull Valley Road during the movement of fabricated steel liners and 2 to 4 shipments per week of SNF storage casks to the proposed PFSF.

Land use. The combined effects of constructing and operating the proposed PFSF at the preferred site (Site A) and constructing and operating the ITF and transporting SNF to the proposed PFSF at Site A by heavy-haul tractor trailer along Skull Valley Road on land use are small. Impacts to land use for construction of the proposed PFSF would be expected to be quantitatively small (since a small proportion of the total land of the Reservation and an even smaller proportion of land within

Skull Valley would be altered), even if the change would be qualitatively different. Construction of the ITF would have minimal land use impacts since the site had been previously disturbed. Impacts to land use are not considered to be additive for the proposed facility and the ITF since they are geographically separate. The indirect impacts (i.e., the impacts generated by in-moving workers) of both the proposed PFSF and the ITF construction and use of Skull Valley Road for movement of materials, workers, SNF on land use would be expected to be small.

Economic structure. The combined effects of constructing and operating the proposed PFSF at the preferred site (Site A) and constructing and operating the ITF and transporting SNF to the proposed PFSF at Site A by heavy-haul tractor trailer along Skull Valley Road on the local economic structure would be beneficial and small to moderate in magnitude. Constructing the proposed PFSF and the ITF would result in approximately 165 jobs during the peak of construction, and many of these jobs are likely to be filled by workers from Tooele County or from other counties within commuting distance. The peak construction period may only last a few months, at which point fewer workers would be required. The labor market available in Tooele County and other counties within commuting distance is capable of supplying most if not all of these position.

In addition to jobs, it is expected that construction and operation of the proposed PFSF would result in increased business for the Pony Express Convenience Store on the Reservation and for other businesses and suppliers in the area. Also, there would be a large benefit to the Skull Valley Band in the form of lease payments for the duration of the proposed PFSF's operation.

6.1.5.4 Impacts of Alternative 4

Because Site B is very close to Site A, there would be no discernible differences in the anticipated impacts to socioeconomic and community resources during construction and operation of the proposed PFSF if it were to be located at Site B. Similarly, the impacts due to construction and operation or use of the ITF and heavy haul transport of SNF along Skull Valley Road would be identical to those described above for the use of Site A with the ITF. Consequently, the combined impacts to socioeconomic and community resources for this alternative are considered similar, if not identical, to those identified for Site A with the ITF.

6.1.6 Cultural Resources

6.1.6.1 Impacts of Alternative 1

The impacts to cultural resources would be small to moderate. Potential impacts at the proposed PFSF site include small impacts to significant cultural resource properties, and require limited mitigation measures. Only the segment of the Hastings Cutoff Trail (42TO1187) intersected by the proposed Skunk Ridge rail line would be directly impacted by construction activities. Cultural resources at the proposed PFSF project area consist of isolated surface artifacts that are expected to be not significant. However, the presence of widely scattered artifacts on the ground surface could indicate a potential for cultural resources to be present below the surface. Cultural resource mitigation measures for the proposed rail line will be included in the MOA resulting from the Section 106 consultation process.

6.1.6.2 Impacts of Alternative 2

In this alternative, the rail line is the same alignment as the proposed action and the proposed PFSF location, Site B, is near to Site A. Based on available cultural resources information, Sites A and B are very similar. Therefore, the potential for impacts to cultural resources would be small to moderate.

6.1.6.3 Impacts of Alternative 3

Construction and operation of the proposed PFSF at Site A would have the same potential for impacts as under the proposed action. Cultural resources identified at the ITF site (see Section 5.6.1.2) have not been evaluated and further inventory and evaluation of these historic features could require additional mitigation, depending on the significance evaluation of these resources. Since no upgrading of the Skull Valley Road is planned, there is no potential for direct impacts to archaeological and historic properties located adjacent to the existing the highway. Therefore, the impacts to cultural resources would be small.

6.1.6.4 Impacts of Alternative 4

Under this alternative, the potential for impacts to cultural resources would be the same as outlined in Section 6.1.6.2 for Site B and the same as Section 6.1.6.3 for the proposed ITF location and the existing Skull Valley Road. Accordingly, the impact to cultural resources for this alternative would be small.

6.1.7 Human Health Impacts

6.1.7.1 Impacts of Alternative 1

Non-radiological impacts. The non-radiological impacts for the proposed action would be small. The estimates of potentially fatal and nonfatal occupational injuries for construction and operation activities would be small for workers. As shown in Table 6.2, the total estimated number of potential fatalities for the construction and decommissioning of the proposed PFSF and rail line would be less than 1 and nonfatal injuries for construction and decommissioning would be 2.3 and 0.32, respectively. Table 6.2 also shows that for normal operations at the proposed PFSF and the rail line, there would be less than 1 expected potential fatality and around 6 nonfatal injuries.

Radiological impacts. The radiological impacts from the proposed action are small. The estimates of radiation doses to the general public for operation of the proposed PFSF (see Section 4.7) and transportation using the Skunk Ridge rail line (see Section 5.7) would be small. Operation of the proposed PFSF and transportation of SNF via the Skunk Ridge rail line would result in exposing the general public and workers to small amounts of radiation. None of the estimates of annual radiological dose to members of the public exceed a small fraction of 1 percent of the radiation doses that members of the general public would likely receive from natural background radiation in the United States. The risk from accidents at the proposed PFSF or during transport of the SNF are considered to be small.

Table 6.2. Estimated fatal and nonfatal occupational injuries for the construction, normal operations, and decommissioning activities at the proposed PFSF and the Skunk Ridge rail line

Activity	Estimated potentially fatal injuries	Estimated potentially nonfatal injuries
Construction		
Phase 1	0.07	0.20
Phase 2	0.062	1.0
Phase 3	0.062	1.0
Rail line	0.005	0.10
Construction total	0.20	2.3
Operations		
PFSF	0.37	4.52
Rail line	0.0023	1.52
Operations total	0.37	6.0
Decommissioning		
PFSF	0.07	0.20
Rail line	0.021	0.12
Decommissioning total	0.09	0.32

Note: Operations include 20 years of operations to load the storage area and 20 years of operations to empty the storage area.

6.1.7.2 Impacts of Alternative 2

Non-radiological impacts. The non-radiological impacts from using Site B with the rail line would be identical to those presented above for the proposed action.

Radiological impacts. The radiological impacts from using Site B with the Skunk Ridge rail line would be indistinguishable from those of the proposed action. While Site B is 800 m (0.5 mile) closer to the nearest resident than Site A, the estimated doses at this location would be small and would be indistinguishable from those at Site A.

6.1.7.3 Impacts of Alternative 3

Non-radiological impacts. The non-radiological impacts of using Site A with the ITF would be small. The estimates for this alternative of potentially fatal and nonfatal occupational injuries for construction, operation, and decommissioning activities would be small for workers. As shown in Table 6.3, the total number of estimated fatalities for construction and decommissioning of the proposed PFSF and ITF would be less than 1 and nonfatal injuries for the construction and decommissioning would be 2.3 and 0.30. Table 6.3 also shows that there would be less than

1 fatality and around 9 nonfatal injuries total at the proposed PFSF and the ITF for normal operations.

Table 6.3. Estimated fatal and nonfatal occupational injuries for the construction, normal operations, and decommissioning activities at the proposed PFSF and the ITF

Activity	Estimated potentially fatal injuries	Estimated potentially nonfatal injuries
Construction		
Phase 1	0.07	0.20
Phase 2	0.062	1.0
Phase 3	0.062	1.0
ITF	0.005	0.10
Construction total	0.20	2.3
Operations		
PFSF	0.37	4.52
ITF	0.034	4.52
Operations total	0.40	9.0
Decommissioning		
PFSF	0.07	0.20
ITF	0.005	0.10
Decommissioning total	0.075	0.30

Note: Operations include 20 years of operations to load the storage area and 20 years of operations to empty the storage area.

Radiological impacts. The radiological impacts from using Site A with the ITF would be small to moderate. The estimates of radiation doses to the general public for operation of the proposed PFSF (see Section 4.7) and transportation using the ITF (see Section 5.7) would be small. However, this alternative could result in exposing the workers to amounts of radiation in excess of NRC occupational exposure limits. Workers involved with transporting SNF from railcars to heavy haul vehicles would also perform category 1 and 2 tasks at the proposed PFSF. The total annual person-rem for these work activities assuming transfer of 200 casks per year is 0.646 person-Sv (64.6 person-rem) [i.e., 0.49 person-Sv (49 person-rem) for unloading casks at the proposed PFSF; 0.037 person-Sv (3.7 person-rem) for maintenance and inspection at the proposed PFSF; 0.119 person-Sv (11.9 person-rem) for handling at the ITF]. Considering that PFS has indicated that only 12–15 workers would be involved in these activities, this could result in individual workers receiving 0.053 Sv (5.3 rem) to 0.0431 Sv (4.31 rem) annually. Therefore, for this alternative, PFS would be required to take additional measures to ensure that its workers receive no more than 0.05 Sv (5 rem) per year, pursuant to 10 CFR Part 20 limits for occupational exposure.

None of the estimates of annual radiological doses to members of the public exceed a small fraction of 1 percent of the radiation doses members of the general public would likely receive from natural background radiation. The risk from accidents at the proposed PFSF or during transport of the SNF are considered to be small.

6.1.7.4 Impacts of Alternative 4

Non-radiological impacts. The non-radiological impacts from using Site B with the ITF would be identical to those presented above for the use of Site A and the ITF.

Radiological impacts. The radiological impacts from using Site B with the ITF would be indistinguishable from those of using Site A with the ITF. While Site B is approximately 1.6 km (1 mile) further from the ITF and 800 m (0.5 mile) closer to the nearest resident than Site A, the estimated additional doses to the public along the short extra length of Skull Valley Road, as well as the slightly larger dose to the nearest resident, would be small and would be virtually indistinguishable from the doses at Site A.

6.1.8 Other Impacts

6.1.8.1 Noise

Impacts of Alternative 1. Sounds from storage facility construction would not be audible along most of the rail line, and vice-versa, due to the large distances between them. When rail-line construction would occur close to the storage facility, noise would not be additive because combined noises are dominated by the loudest source. Several proximate noise sources would not be expected to add more than about 3 decibels to the noise of the loudest source. These concepts also apply to site operation, when the delivery locomotive, switch engine, emergency generator, and a few vehicles might all be operating simultaneously. In this case, the combined noises are unlikely to be more than about 3 decibels greater than the loudest source, which would be the diesel switch engine whistle.

Impacts of Alternative 2. Noise impacts would be difficult to distinguish from Site A with a rail line. Noise from construction would be expected to last about 3 percent longer because the additional construction would be expected to take more time. Also, the delivery locomotive would generate noise over an additional 3 percent distance (and, presumably, for 3 percent more time) each time a delivery is made.

Impacts of Alternative 3. Sounds from construction at the storage facility would not be audible at the ITF facility, and vice-versa, due to the large distance between those sites. In any case, as noted above, noise from proximate sources tends to be dominated by the loudest source. Delivery vehicles would likely dominate the noise at the storage facility, which would otherwise be relatively quiet. An ITF facility would obviate the use of train transport, and the unlikely possibility of a train whistle on very rare occasions. However, SNF heavy-haul vehicles on Skull Valley Road would add noticeable noise which could sometimes be distracting to residents along the route.

Impacts of Alternative 4. Noise impacts of Site B with the ITF would be difficult to distinguish from Site A with an ITF. Heavy-haul vehicles would generate noise over an additional 3 percent distance (and, presumably, for 3 percent more time) each time a delivery of SNF is made to the proposed PFSF.

6.1.8.2 Scenic Qualities

Impacts of Alternative 1. Construction and operation of the proposed PFSF at Site A, when combined with construction and operation of the rail line and siding, would change the scenic quality of Skull Valley by introducing an industrial presence into a largely undeveloped landscape. The staff concludes that changes in the scenic quality of the landscape, primarily due to construction and operation of the proposed PFSF at Site A, would represent moderate impacts to recreational viewers, moderate impacts to residents of Skull Valley, and moderate impacts to motorists traveling Skull Valley Road. The staff concludes that the combined visual impact would be moderate because the visual presence of the proposed facilities would alter noticeably the scenic qualities of Skull Valley. The analyses explaining these conclusions are contained in Sections 4.8.2 and 5.8.2.

Impacts of Alternative 2. Construction and operation of the proposed PFSF at Site B, when combined with construction and operation of the rail line and siding, would change the scenic quality of Skull Valley by introducing an industrial presence into a largely undeveloped landscape. For visual impacts, only minor difference between Site A and Site B is that the new rail line to Site B would have to be 800m (2,600 feet) longer than the line to Site A. The staff concludes that changes in the scenic quality of the landscape, primarily due to construction and operation of the proposed PFSF at Site B, would represent moderate impacts to recreational viewers, moderate impacts to residents of Skull Valley, and moderate impacts to motorists traveling Skull Valley Road. The staff concludes that the combined visual impact would be moderate because the visual presence of the proposed facilities would alter noticeably the scenic qualities of Skull Valley. The analyses explaining these conclusions are contained in Sections 4.8.2 and 5.8.2.

Impacts of Alternative 3. Construction and operation of the proposed PFSF at Site A, when combined with construction and operation of the ITF, would change the scenic quality of Skull Valley by introducing an industrial presence into a largely undeveloped landscape. The staff concludes that changes in the scenic quality of the landscape, primarily due to construction and operation of the proposed PFSF at Site A, would represent moderate impacts to recreational viewers, moderate impacts to residents of Skull Valley, and small impacts to motorists traveling Interstate 80. The staff concludes that the combined visual impact would be moderate because the visual presence of the proposed facilities would alter noticeably the scenic qualities of Skull Valley. The analyses explaining these conclusions are contained in Sections 4.8.2 and 5.8.2.

Impacts of Alternative 4. Construction and operation of the proposed PFSF at Site B, when combined with construction and operation of the ITF, would change the scenic quality of Skull Valley by introducing an industrial presence into a largely undeveloped landscape. The staff concludes that changes in the scenic quality of the landscape, primarily due to construction and operation of the proposed PFSF at Site B, would represent moderate impacts to recreational viewers, moderate impacts to residents of Skull Valley, and small impacts to motorists traveling Interstate 80. The staff concludes that the combined visual impact would be moderate because the visual presence of the proposed facilities would alter noticeably the scenic qualities of Skull Valley. The analyses explaining these conclusions are contained in Sections 4.8.2 and 5.8.2.

6.1.8.3 Recreation

Impacts of Alternative 1. The combined effects of constructing and operating the proposed facility at the preferred site (Site A) and constructing a new rail siding at Skunk Ridge and a new rail

corridor connecting the Skunk Ridge siding with Site A and then transporting SNF to Site A by rail on recreational resources and opportunities are expected to be small. Construction and operation of the proposed PFSF and rail line would not prevent access to recreational resources, but these activities are likely to result in some delays or inconvenience to users wishing to access recreational resources and opportunities, particularly during construction, when (1) access to these resources in Skull Valley would be adversely affected by the movement of construction materials and workers on Skull Valley Road (i.e., for construction of the proposed facility) and (2) access to resources west of the proposed rail line would be affected by rail line construction. Since access to recreational resources west of the proposed rail line must be made by way of Skull Valley Road, these particular impacts are additive. During the later phases of construction and during the operations period, impacts to recreational resources and opportunities should be smaller (i.e., with much less traffic along Skull Valley Road), although there may continue to be some continuing difficulty in accessing resources west of the proposed rail line. Construction and operations of the proposed facility and rail line should result in small indirect impacts to recreational resources and opportunities.

Impacts of Alternative 2. Because Site B is very close to Site A, there would be no discernible differences in the anticipated impacts to recreational resources and opportunities during construction and operation of the proposed PFSF if it were to be located at Site B. Similarly, the impacts due to construction and operation or use of the proposed rail line are identical to those described in Section 6.1.8.3 for the proposed action. Consequently, the combined impacts to socioeconomic and community resources for this alternative are considered similar to those identified for the proposed action.

Impacts of Alternative 3. The combined effects of constructing and operating the proposed PFSF and a ITF near Timpie are expected to be small. The impacts due to construction and operation or use of the ITF and shipment of SNF by heavy-haul tractor trailer along Skull Valley Road to recreational resources and opportunities are expected to be almost non-existent during construction (since the site of the ITF is close to Interstate 80 and is not expected to affect recreational resources) and should result in delays for users traveling along Skull Valley Road to access recreational resources and opportunities in Skull Valley during operations. Consequently, the combined impacts to recreational resources and opportunities for this alternative are considered to be small during construction and even smaller during operations.

Impacts of Alternative 4. Because Site B is very close to Site A, there would be no discernible differences in the anticipated impacts to recreational resources and opportunities during construction and operation of the proposed PFSF if it were to be located at Site B. Similarly, the impacts due to construction and operation or use of the ITF and heavy haul transport of SNF along Skull Valley Road are identical to those described above for the use of Site A with the ITF. Consequently, the combined impacts to recreational resources and opportunities for this alternative are considered similar to those identified for Site A with the ITF and would be small.

6.2 Environmental Justice

Executive Order 12898 (59 Fed. Reg. 7629) directs Federal executive agencies to consider environmental justice under NEPA, and CEQ has provided *Guidance for Addressing Environmental Justice Under the National Environmental Policy Act* (December 1997). This Executive Order

ensures that minority and low-income groups do not bear a disproportionate share of negative environmental consequences. Although NRC is an independent agency, the Commission has committed to undertake environmental justice reviews and has provided specific information requirements in Nuclear Material Safety and Safeguards (NMSS) Policy and Procedures Letter 1-50, Revision 2, "Environmental Justice in NEPA Documents," September 1999.

This environmental justice review includes an analysis of the human health and environmental impacts on low-income and minority populations resulting from the proposed action and its alternatives. The first step in the review was to analyze demographic data to identify the minority and low-income groups within the area of environmental study. Next, the impacts from the proposed action and its alternatives were evaluated to determine if the impacts disproportionately affected minority and low-income groups in an adverse manner.

For the purposes of this review, "minority" is defined as individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population is one where the minority population exceeds 50 percent or where the minority population of the environmental impact site is significantly greater than the minority population percentage in the geographic area of study. A "low-income" population is defined as one where the percentage of households below the poverty level in an environmental impact site is significantly greater than the low-income population percentage in the geographic area of study. As a general matter (and where appropriate), the NRC staff may consider differences greater than 20 percentage points to be significant (NRC/NMSS 1999). NRC policy (NRC/NMSS 1999) states that when determining the area for impact assessment for a facility located outside the city limits or in a rural area, a 6.4-km (4-mile) radius [or 130 km² (50 miles²)] should be used.

Under NMSS procedures, additional census blocks groups may be identified by relaxing these criteria if local circumstances appear to warrant. In the current situation, the State of Utah has very low percentages of minority populations, and rural areas in the State tend to have sparsely-populated large block groups. In addition, the analysis examines transportation routes into the proposed PFSF site. As a result of the proposed action being examined and the local circumstances, the area for impact assessment was expanded to an 80 km (50 miles) radius to examine local transportation routes into the facility. The percentage criterion was left at 20 percentage points; however, the staff also examined a 10 percentage point difference to see if additional relatively small pockets of low income and minority residences could be identified. In addition, the portion of the proposed rail routes beyond the 80 km (50 mile) radius impact assessment area but within the State of Utah were also examined to determine if any minority and low-income populations exist along these routes.

Usually, a minority population would be one with a minority percentage of 50 percent or a percentage 20 percentage points greater than in the geographic area of study (usually the State and counties that include the environmental impact site) because the percentage of minorities in the county is nearly identical to the percentage of minorities in the State. For example, for the State of Utah, the Native American population is 1.4 percent, and the total minority population is 8.71 percent. Therefore, a census block group within the impact assessment area with a Native American population of at least 21.4 percent or with a minority population of at least 28.7 percent would count as a minority population worthy of further study. A similar analysis is conducted for the low income population.

In some cases, minority and low-income groups may rely on environmental resources for their subsistence and other cultural practices. Therefore, NMSS guidance also specifies that the staff make inquiries regarding special resource uses or dependencies of identified minority and low-income populations, including cultural practices and customs, previous environmental impacts and features of previous and current health and economic status of the identified groups. In some circumstances, these groups might be unusually vulnerable to impacts from the proposed action.

Potential resource dependencies were identified in the course of public meetings and other information supplied by the Skull Valley Band, by Ohngo Gaudadeh Devia (an organization representing part of the Skull Valley Band), and by the Confederated Tribes of the Goshute Reservation, who are relatives of the Skull Valley Band, but reside on another Reservation on the Nevada-Utah border near Wendover, Utah. Also, the cooperating agencies sent letters to several local Federally recognized Indian Tribes describing the proposed construction and operation of the Skunk Ridge rail line, and to solicit their concerns on the project and to inquire about whether they desired to participate in the Section 106 consultation process (see Appendix B). Only the Confederated Tribes of the Goshute Reservation has responded. Inquiries also were made by PFS to the State of Utah concerning health status of the Skull Valley Band, and the staff made additional inquiries to the Indian Health Service. The results are described below.

6.2.1 Impacts of Alternative 1

The staff examined the geographic distribution of minority and low income populations within 50 miles of the proposed PFSF and along principal rail routes within the State of Utah, based on 1990 U.S. Census data, supplemented by field inquiries by PFS to the local planning departments in Tooele and Salt Lake Counties and social service agencies in the State. The record of public comment was also reviewed to see if any groups were missed.

6.2.1.1 Demographics

Minority populations. The significant minority populations near the proposed PFSF are members of the Skull Valley Band, both on the Reservation and in the nearby town of Grantsville. There is a combined non-Reservation population of about 120 Skull Valley Band members, most of whom reside in outlying communities such as Grantsville and Salt Lake City. The Reservation population is approximately 30 persons, most of whom are Skull Valley Band members; however, some non-members, such as spouses, also live on the Reservation (see Section 3.5.1). Figure 6.1 illustrates the geographic distribution of census block groups meeting the 20 percentage point criterion for minority populations in the 1990 U.S. census within 80 km (50 miles) of the proposed PFSF. In the figure, the block group surrounding the proposed PFSF site (shaded) and 5 block groups in Salt Lake City (shaded and circled) meet the 20-percentage point criterion. Table 6.4 shows the percentages of the various minority populations for each census block group within 80 km (50 miles) that satisfies the criteria used for this analysis. A table that shows the minority and low-income percentages for each census block group within 80 km (50 miles) of the proposed PFSF is shown in Appendix E. In the table, the census block groups meeting the 20 percentage point criterion are in boldface, and the additional block groups meeting the 10 percentage point criterion are in italics. It should be noted that for this analysis, the State was used as the area of geographic study. Therefore, the minority and low-income populations were based on a comparison to the State averages. The county averages nearest the proposed project (e.g., Tooele, Salt Lake) have minority and low-income populations similar to the State of Utah. Relaxing the criteria would expand the

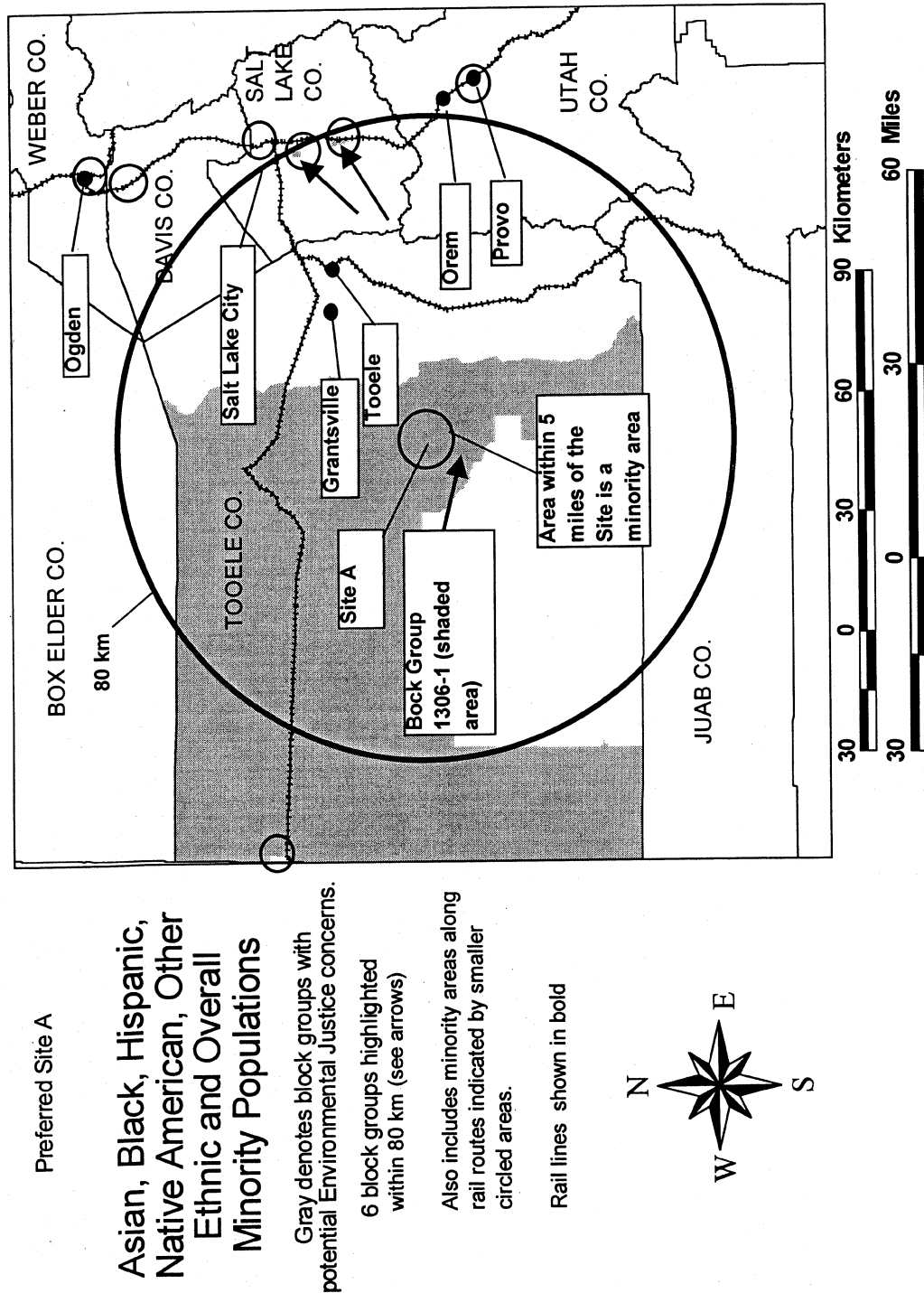


Figure 6.1. Geographic distribution of minority census block groups near the proposed PFSF site in Skull Valley.

Table 6.4. Minority and low income block groups within 80 km (50 miles) of the preferred site

County and tract	Block group	Persons	Below poverty level (percent)	Total whites (percent)	Black (percent)	Native American (percent)	Asian and Pacific Islander (percent)	Other (percent)	Hispanic (all races) (percent)	Minorities (racial minorities plus white hispanics) (percent)
State of Utah		1,722,850	11.4	93.9	0.6	1.4	1.9	2.1	4.8	8.7
Threshold for environmental justice concerns		—	31.4	—	20.6	21.4	21.9	22.1	24.8	28.7
Utah										
0106	1	1,151	19.0	85.8	0.0	1.7	0.3	12.3	16.2	16.7
Tooele										
1306	1	338	15.0	72.8	0.0	23.1	1.8	2.4	6.2	28.2
1310	1	1,390	8.1	94.8	0.4	1.4	0.4	2.9	13.8	20.0
1310	3	797	16.8	89.6	0.8	1.1	1.9	6.6	16.4	20.5
1310	4	898	24.7	86.5	0.3	1.4	0.4	11.2	16.4	18.3
Salt Lake										
1028	4	2,715	16.7	71.1	4.6	1.7	13.6	9.0	17.0	37.7
1116	6	1,200	35.5	91.3	0.8	1.3	3.3	3.2	7.3	10.8
1121	1	784	24.7	94.9	0.3	2.4	1.3	1.1	9.2	21.3
112401	3	613	13.8	68.2	0.3	2.6	2.9	25.9	37.4	50.2
112401	4	1,657	36.3	82.6	0.7	3.2	2.3	11.2	26.0	29.0
112401	5	995	52.0	70.8	1.0	2.9	9.2	16.1	31.9	51.6
112402	3	2,218	15.8	87.4	0.1	0.2	7.8	4.5	10.1	18.9
112801	4	3,311	0.5	82.5	6.6	2.4	1.5	7.0	14.8	25.7
112908	4	1,219	31.8	91.4	0.4	0.5	4.4	3.3	9.8	11.8
112908	5	828	8.6	91.8	0.0	0.2	2.9	5.1	11.7	19.4
1131	5	1,233	24.3	98.3	0.4	0.5	0.1	0.7	2.6	3.5
113304	2	882	32.0	87.9	1.2	1.7	2.3	6.9	12.2	14.1
113304	5	1,778	31.5	84.1	1.3	2.5	7.5	4.6	8.5	21.1
113305	1	1,397	23.1	83.7	3.3	2.3	4.9	5.8	13.1	21.8
113305	3	1,174	53.7	57.4	0.8	10.7	26.0	5.1	7.8	46.5
113306	1	1,855	23.0	85.3	3.3	1.2	5.0	5.2	9.6	20.6
113307	2	1,469	21.9	84.9	0.9	1.6	7.6	5.0	8.2	17.8
113308	1	974	23.6	83.8	1.4	4.0	3.6	7.2	11.9	20.9
113308	3	1,263	25.5	87.6	0.9	3.4	6.1	2.0	9.5	18.2
113405	1	2,763	4.7	81.0	1.0	0.8	13.0	4.2	7.5	22.8
113406	2	1,926	21.2	84.5	0.9	1.8	7.9	4.8	8.7	21.0
113407	2	699	19.6	90.4	0.3	1.0	1.9	6.4	12.4	23.9
113519	4	1,552	23.3	91.3	1.5	1.0	1.3	4.8	10.4	14.2
113802	2	1,476	17.6	93.4	0.8	0.3	2.0	3.5	13.1	19.7
113901	3	1,636	31.7	90.6	0.9	0.4	2.8	5.3	15.6	23.4
Juab										
9732	2	191	20.7	73.8	0.0	18.8	0.0	7.3	7.9	26.2

number of block groups counted as minority block groups within 80 km (50 miles) from 6 to 18, but would not significantly change the picture of their location. These additional block groups tend to be near those in Salt Lake City already identified using the 20-percentage point criterion. Most of Skull Valley is in a single block group (Tract 1306, Block Group 1), and it is the only block group within about 6 km (4 miles) of the proposed PFSF facility.¹ It is a minority block group.

¹PFS indicates that about 83 percent of persons living within 5 miles of the preferred site are minorities (PFS/ER 2000).

There is a small Native American population in north-central Salt Lake City. A few block groups in the north and central parts of Salt Lake City, in the central Ogden area and between Ogden and Salt Lake City in the general vicinity of Clinton, West Point, and Clear Field, are near the proposed rail routes and met the criteria used for this analysis to determine a minority population.

Hispanics are Tooele County's principal minority group, with 2960 individuals. There is a Hispanic community in Tooele that does not rise to the 20 percent criterion used for this analysis to determine a minority population (Tract 1310 has three block groups in which the number of Hispanics as a percent of population exceeds that for the state as a whole by 10 percent or more). Hispanic populations in west and northwest Salt Lake City satisfy the 20 percent criterion. In north Salt Lake County beyond 80 km (50 miles) from the proposed PFSF, there are about a dozen block groups that satisfy the minority and low income criteria and are near the principal rail route. Also, there are concentrations of Hispanics and other minorities in Davis and Weber Counties beyond 80 km (50 miles) from the proposed PFSF site. Weber County (Ogden and vicinity) has several block groups that have majority or near-majority Hispanic populations. In some cases, these block groups appear to be within a mile of the main rail corridors to the proposed PFSF site.

Beyond 80 km (50 miles) from the proposed PFSF, one block group in Davis County showed almost 27 percent black (76 percent minorities), and two in Salt Lake County and one in Davis county were over 25 percent Asian. These communities are near the proposed rail routes. No other significant minority populations were identified in any census block group either close to the proposed PFSF site or along the proposed transportation corridors into the site. This indicates that other minority populations are either well-mixed into the majority population, or other minority populations are too small to be captured in the census detail.

In summary, 6 block groups within 80 km (50 miles) of the proposed PFSF were identified to satisfy the criteria used in this analysis to define a minority population. The minority population nearest to the proposed site is the Skull Valley Band living on the Reservation. As a result, the impacts on this group were analyzed to determine if a disproportionate high and adverse impact would occur from construction and operation of the proposed PFSF.

Six minority block groups within 80 km (50 miles) of the proposed PFSF and 45 minority block groups within the State of Utah, but beyond 80 km (50 miles) from the proposed PFSF site were identified to live near the proposed transportation routes (i.e., rail routes). Because minority and low income populations living near these rail routes would likely have more SNF shipments pass them, the impacts to these populations were analyzed to determine if a disproportionate high and adverse impact occurred from the transportation of SNF to the proposed PFSF.

Low-income populations. Figure 6.2 shows the distribution of low-income populations for several counties in the State of Utah, and includes the environmental study area out to 80 km (50 miles) from the proposed PFSF site. The figure identifies the general location of 8 block groups meeting the 20 percentage point criterion. Detailed information on individual block groups within 80 km (50 miles) that satisfy the criteria used for this analysis is shown in Table 6.4 (block groups that meet the 20 percentage point criterion are in boldface and those meeting the 10 percentage point sensitivity criterion are in italics). Neither the Skull Valley block group nor Tooele County as a whole would be identified as a low-income population by the NMSS criteria. Of the 320 persons in the Skull Valley block group, only 15 were counted as below the poverty line in 1990. Recent inquiries by PFS indicate that this number may now be "about 17." These may disproportionately include residents of

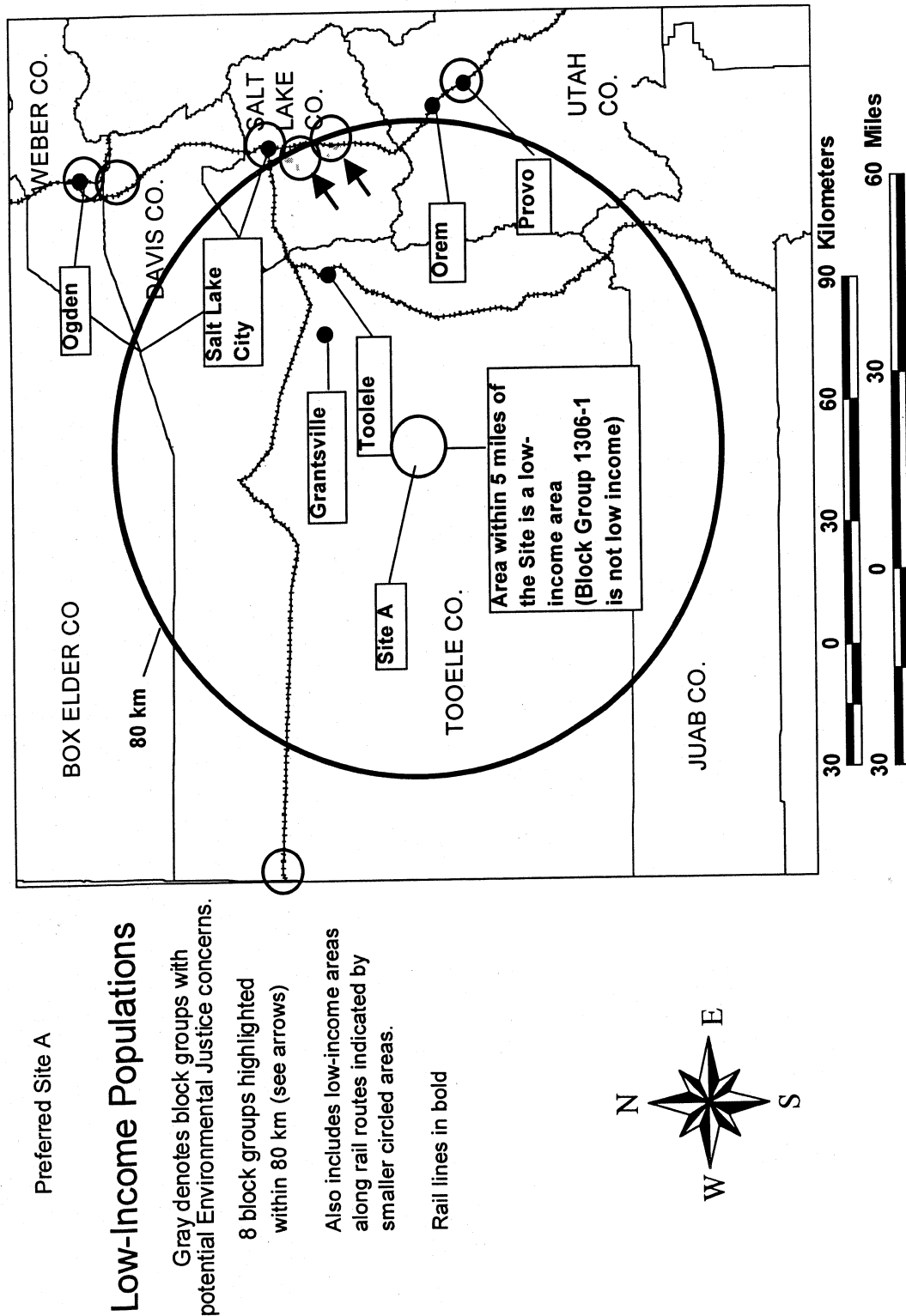


Figure 6.2. Geographic distribution of low-income census block groups near the proposed PFSF site in Skull Valley.

the Reservation, but the census data do not provide this information (see Section 3.5.1). PFS indicates that over 61 percent of the people within 5 miles of the preferred site (Site A) are low income (PFS/ER 2000). The concentration of low-income populations is slightly elevated in Grantsville, Tooele, and south/southeast Tooele County but does not satisfy the 20 percentage point criterion used for this analysis. The main low-income areas within 80 km (50 miles) of the proposed PFSF are located, as shown in Figure 6.2, in central and northern Salt Lake County, within a mile or two of the principal rail corridor. Beyond 80 km (50 miles) of the proposed PFSF, the principal low-income areas appear to correspond closely with the minority communities in Weber (Ogden) and in Salt Lake and Davis Counties near the rail line. In addition, there are a few non-minority low-income block groups near the rail in the Provo-Orem area, which may, in part, reflect the presence of the student population of Brigham Young University. In summary, the nearest low-income groups in the region include populations within 6.4 km (4 miles) of the site, including individuals living on the Reservation, in Grantsville, Tooele, the south/southeast portion of Tooele County, and near the rail line.

6.2.1.2 Assessment of Impacts

For each of the areas of technical analysis presented in this DEIS, a review of impacts to the human and natural environment was conducted to determine if any minority populations or low-income populations could be subject to disproportionately high and adverse impacts from the proposed action. The review includes potential impacts from the construction and operation of the proposed PFSF and the Skunk Ridge rail line.

Through the scoping process, affected representatives of the Skull Valley Band and neighboring Indian Tribes expressed their concerns with the project and identified how they perceived how the construction and operation of the proposed PFSF and Skunk Ridge rail line would affect them. These discussions elicited a concern that adverse impacts to the portion of the Reservation that would be used for the proposed PFSF, and nearby tribal trust and BLM lands could also affect the cultural values of the Skull Valley Band and other Native Americans. The impacts identified involved disturbance, destruction, or limitations of services from ecological and biological resources, altered land forms; and a noise or visual impact to sacred sites. The level of impact to cultural values associated with natural resources would be dependent on the cultural values associated with the land disturbed under each of the alternatives. Specific concerns are as follows:

- Potential loss of property values for houses owned by Tribal members
- Potential groundwater conflicts with wells supplying water to Tribal members
- Potential loss of opportunity to collect, or potential airborne or waterborne contamination of, plant and animal resources near the proposed PFSF site (no plant and animal resources appear to be collected on the land that would be inside the proposed PFSF outer fence)
- Potential contamination (probably airborne, given the locations involved) of sacred burial sites within 0.8 km (0.5 mile) of the Skull Valley Band village.

For each area of analyses, impacts were reviewed to determine if any potential adverse impacts to the surrounding population would occur because of SNF transport, construction, normal operations, or accident conditions. If potential adverse impacts were identified, a determination was made as to whether minority or low-income populations would be disproportionately affected. Table 6.5 presents a summary of the potential impacts to low-income and minority populations, without considering any mitigation actions.

Table 6.5. Potential impacts of the proposed action on minority and low-income populations

Potential impact ^a	Potentially affected minority population or low income community	Level of impact
Geology, minerals, and soils	Skull Valley Band	Small
Water Resources	Skull Valley Band	Small
Air quality	Skull Valley Band	Small
Ecology	Skull Valley Band	Small
Socioeconomic and community resources	Skull Valley Band	Small to moderate
Land use		moderate (but beneficial)
Employment		
Population		
Housing values		
Economic structure	Skull Valley Band; other	Moderate to large
Traffic	Federally Recognized Indian Tribes	(and beneficial) moderate to large
Cultural resources	Skull Valley Band	Small to moderate
Human health	Skull Valley Band, low income	Small
Radiological	and minority populations near	
Non-radiological	proposed rail routes	
Noise	Skull Valley Band	Small to moderate
Scenic qualities	Skull Valley Band	Moderate
Recreation	Skull Valley Band	Small

^aAll other potential impacts were small and not disproportionate.

Adverse impacts are defined as negative changes to the existing conditions in the physical environment (e.g., land, air, water, wildlife, vegetation, human health, etc.) or negative socioeconomic changes. Disproportionate impacts are defined as impacts that may affect minority or low-income populations at levels appreciably greater than effects on non-minority or non-low-income populations. The cooperating agencies conclude that no disproportionately high and adverse impacts will occur to the Skull Valley Band or to minority and low income populations living near the proposed rail routes from the proposed action.

Impacts to the geology, minerals, soils; water resource; air quality; and ecology from the proposed action. Land distances and changes to land forms could result from such activities as the construction of roads and buildings at the proposed PFSF site. Fugitive dust emissions from such activities, if not properly controlled, may also be an issue at the nearest residences, which are Skull

Valley Band-owned. These impacts are most likely to occur where most construction activity is likely to take place, in and around the proposed PFSF site and along the rail corridor into the site. The impacts are most likely to be seen from Skull Valley road, Hickman Knolls, the Stansbury Mountains to the east of the site, and the Cedar Mountains to the west of the proposed PFSF. Some of these locations are sacred sites of the Skull Valley Band. Noise and dust associated with the construction and operation of the proposed PFSF are not expected to affect the nearest residents (Section 4.8), would only slightly and temporarily affect wildlife (Section 4.4), and would likely have small, if any, potential to impact the Stansbury Mountains, Cedar Mountains, or Hickman Knolls. Vegetation and wildlife are expected to be affected only within the 330 ha (820 acre) OCA, the access road, and rail corridor. The impacts to these areas are not expected to be significant (see Sections 4.4 and 5.4). As described in Sections 4.8.2, 5.8.2, and 6.1.8.2, the scenic qualities to members of the Skull Valley Band could be moderately impacted. Mitigation measures are described in Section 4.8.2. A significant increase in traffic on Skull Valley Road would occur during the initial phase of construction (see Section 4.5). This period of inconvenience would be short. Although traffic would increase, all travelers on Skull Valley Road including those workers traveling to Dugway would be affected. Therefore this would not represent a disproportionate impact to minority and low income groups in the area. There are expected to be no groundwater conflicts between the site and the nearest well that belongs to a member of the Skull Valley Band.

Human health impacts at the proposed PFSF. Although minority and possibly low-income populations live relatively near the proposed PFSF site [i.e., within a 5 km (3 mile) radius], including the nearest residence, which is within 3.2 km (2 miles) of the proposed PFSF, it is very unlikely that normal operations would affect them with radiological and non-radiological health impacts and other risks. Even though the nearest resident populations are Goshutes, these risks would most likely be insignificant for any offsite population for any alternative discussed in this DEIS (see Section 4.7). Therefore, it is unlikely that any minority or low-income population would be disproportionately and adversely affected by normal operations of the proposed PFSF.

No credible accident scenarios for the proposed PFSF could be found with potentially significant releases of radionuclides to air or ground that could result in significant affects to any offsite populations. Thus, there is no mechanism for disproportionate environmental effects through accidents on minority residents near the proposed PFSF. Section 4.7 shows that even the most severe hypothetical accident analyzed, which is not credible, an undetected leak, lasting 30 days, would result in exposure of 0.76 mSv (76 mrem) at the nearest offsite boundary. Such an exposure is over 60 times less than the 0.05 Sv (5 rem) exposure limit for accidents in 10 CFR 72.106. An exposure of 0.76 mSv (76 mrem), which is 25 percent of natural background radiation, is not considered a high adverse impact.

Human health impacts from transportation. Based on their location with respect to rail routes through the Salt Lake City and Grantsville areas, some minority and low income populations existing along the rail lines would be affected by radiological exposure due to either routine operations or accidents during transportation of SNF to the proposed PFSF. However, the transportation analysis (Section 5.7) found that the impacts from transporting SNF to the proposed PFSF would be small from normal operations or from accidents. Thus, no disproportionately high and adverse effects are expected for any particular segment of the population, including minority and low-income populations that may exist along the proposed rail routes.

Socioeconomic impacts. In addition to the socioeconomic impacts discussed in Section 4.5, three additional areas were identified during the scoping process that could adversely and potentially disproportionately impact minority and Native American populations or low-income populations. These impacts include (1) potential increases or decreases in housing values that could adversely impact access to affordable housing by low-income populations; (2) continued restrictions on access to the proposed PFSF site by all individuals;² and (3) reduction in the services which the proposed PFSF site provides Native Americans. These types of impacts are addressed in the following paragraphs.

Impacts of housing costs on low-income populations. Current projections (Section 3.5) show that housing prices in Skull Valley and nearby towns are expected to increase steadily from 1997 through 2040 under baseline conditions. Housing prices in Tooele County are expected to increase in part because, as the Salt Lake Valley population increases, Tooele and Grantsville populations and the local workforce with it are expected to continue to increase as well. The baseline conditions used in the impact analysis of the alternatives on the housing market in Tooele County did not assume any increase in low-income housing or rental units or housing cost subsidies and assistance by Federal, State, or local low-income housing agencies or programs. Changes from these baseline conditions or other substantial changes in the Tooele economy could modify the net impact of the alternatives on the housing market. If the housing market in Tooele County does not experience the levels of price increases shown in the EIS, the impact on low-income communities would be correspondingly reduced.

As set forth in Section 4.5, the population in Tooele County is expected to grow, due to the proposed PFSF workforce, by fewer than 100 persons (47 households) who are not members of the Skull Valley Band. Most of these persons are expected to live at Grantsville or Tooele and not on the Reservation. Associated population increases would be minimal, and increased demand for housing over and above the existing demand would be small. The proposed PFSF in and of itself would have minor impacts on housing prices off the Reservation and, when added to the other regional employment impacts, would not adversely impact the access of low-income populations in Grantsville and Tooele to affordable housing.

The Skull Valley housing market is isolated by geography, and part of the valley is also isolated by its Reservation status from the rest of Tooele County. The Reservation itself is not a normal housing market. The only persons who may reside on the Reservation itself are Tribal members, spouses of Tribal members, and their children. The values of existing houses do not include the value of underlying land, which remains in trust to the Skull Valley Band. Housing prices also reflect the strong presence of Federal housing programs. It is not clear whether there is an active housing market on the Reservation.

Impacts on Reservation housing prices would partly depend on whether the proposed PFSF would attract Tribal members back to the Reservation and partly on the financing mechanisms used. If some Skull Valley Band members moved back to the Reservation to take jobs at the proposed PFSF, there might be some increase in demand for housing on the Reservation, but whether returning residents simply build new housing, with no effect on the nominal value of existing homes

²Note that access restrictions would apply to both the Skull Valley Band and to members of the Confederated Tribes of the Goshute Indians, some of whom have expressed an interest in access to and unrestricted use of the Reservation. The impacts have been estimated as small, and no mitigation is planned.

is not known. In any case, due to the small number of workers expected to move back to the Reservation, the impact on housing price is expected to be small.

Impacts from restrictions on access to Reservation lands and the transportation corridor.

Access to the proposed PFSF site would be restricted once construction begins. Also, land use would change along the preferred transportation corridor through the BLM lands to the north and west of the site, possibly preempting some traditional land uses. Some members of the Skull Valley Band have expressed a desire to have access to and use of the Tribal lands in the vicinity of the proposed PFSF now and in the future. The impacts on access to traditionally used lands and resources are expected to be small, and mitigation is not planned. Restrictions on land access to the west of the rail line could be mitigated by grade crossings, as noted in Section 5.5.

The area of restriction that would result from the construction and operation of the proposed PFSF and rail line are relatively small in size when compared to the overall size of the Reservation and the rest of Skull Valley, and these areas do not contain any known features that are unique to Skull Valley. Access to the rail line would be limited only for areas under construction. Furthermore, only one cultural artifact has been identified in the proposed areas of restriction (see Section 5.6). Therefore, impacts from restricted-access to the proposed PFSF site and any restriction associated with access to the rail corridor is considered to be small.

Positive socioeconomic impacts. The proposed PFSF would provide substantial lease income to the Skull Valley Band and would result in a large positive impact. In addition, the lease requires PFS to provide employment preferences first to members of the Skull Valley Band, second to children of Skull Valley Band members, and third to members of other Federally recognized Indian Tribes. The preferences would be for all positions including skilled technical and management positions, and only to the extent they are in compliance with Federal law. These impacts would be disproportionately beneficial to the Skull Valley Band and other Native Americans.

Cultural resource impacts. Some Skull Valley Band members state that portions of the area near the proposed PFSF site have been used by Native Americans for religious purposes, hunting, and gathering of foods (e.g., deer, wild plants, sage hens, pheasants) and other plant material such as sagebrush and willows. In the scoping meeting, members of the Skull Valley Band stated that the surrounding territory near the proposed PFSF site and the Skunk Ridge rail corridor have been used to gather plants that figure prominently in the traditional practices and religion of the Native Americans. It is quite possible that these resource services which the site provides to the Native Americans could be diminished under proposed action but these resource services are not unique to these areas of Skull Valley and are readily accessible and easily obtainable in the immediate surrounding areas. Therefore, the impacts would be small.

6.2.2 Impacts of Alternative 2

Because of the close proximity of the two Skull Valley alternatives and the other similarities between the two sites (they are less than a mile apart, and both are on the Reservation), there is no significant difference in the impacts between Skull Valley Sites A and B from an environmental (Sections 4.1 through 4.4, 4.7), socioeconomic (Section 4.5), cultural (Section 4.6), or, consequently, an environmental justice perspective. Site B would require an additional 800 m (2,600 ft) linear distance and 9.7 ha (24 acres) for the proposed rail line. This additional land would not result in any significantly different environmental justice impacts from those described for the rail

line in Section 6.2.1. Therefore, the environmental justice impacts from this alternative would be nearly identical to those described above for the proposed action.

6.2.3 Impacts of Alternative 3

The construction and operation of the proposed PFSF at Site A and the ITF would potentially affect the same minority and low-income populations identified in Section 6.2.1. The environmental justice impacts from the construction and operation of the site would be the same as those described in Section 6.2.1. The area for the proposed ITF has not been identified by any groups as an area used for hunting or gathering or holding any cultural significance for any Native Americans or other minority or low-income populations. The operation of the ITF would have adverse radiological and non-radiological impacts to individuals using Skull Valley Road (see Sections 5.5 and 5.7). However, these impacts are considered to be small and would affect all users of Skull Valley Road. Therefore, no disproportionately high and adverse impacts would occur from this alternative.

6.2.4 Impact of Alternative 4

Because of the close proximity of the two Skull Valley alternatives and the other similarities between the two sites (they are less than a mile apart, and both are on the Reservation), there is no significant difference in the impacts between Skull Valley Sites A and B from an environmental (Sections 4.1 through 4.4, 4.7), socioeconomic (Section 4.5), cultural (Section 4.6), or environmental justice perspective. Therefore, the environmental justice impacts from this alternative would be nearly identical to those described above for Site A with the ITF.

6.3 Cumulative Impacts

The cumulative impacts of the proposed action are presented and discussed in this section. The impacts of the proposed action, as described in Section 6.1, are combined with other past, present, and reasonably foreseeable actions, including, where appropriate, the presence of other industrial facilities in the region (see Figure 1.1), to determine whether cumulative impacts exist. Very little development has occurred in Skull Valley, and from the information provided in Tooele County planning documents, PFS reports (PFS/ER 2000) that no new private projects are planned for Skull Valley.

6.3.1 Geology, Minerals, and Soils

Cumulative impacts of construction and operation of the proposed facility in Skull Valley with other proposed construction projects in the area involve the competition for and use of aggregate, crushed rock, and other mineral resources. Because there are no planned projects in Skull Valley and because of the abundance of these materials in the area, the potential for adverse cumulative impacts to geological resources is considered to be small.

6.3.2 Water Resources

Surface water. Cumulative hydrologic impacts of the proposed action would be small. Some minor impacts would likely occur to surface water channels as a result of construction and operation of the proposed PFSF and access routes. Such impacts would be comparable to or less than the effects observed along existing transportation routes such as existing railroads, Skull Valley Road, and other highways. Mitigation measures that would be implemented as part of construction and operational BMPs would result in less impact from the proposed new facilities than are observed in older transportation infrastructure.

Groundwater. Most of the water used for construction of the proposed PFSF and its associated access routes would be purchased from offsite sources and transported to the points of use. There are no known plans for other projects that would require withdrawal of groundwater that, if implemented in addition to the PFSF, would potentially cause an adverse impact on groundwater availability in Skull Valley. No adverse hydrologic impact would result from obtaining water offsite to support construction in Skull Valley. Onsite water use would require less than about 40 L/min (10 gal/min) of groundwater withdrawal from the aquifer in Skull Valley. Groundwater in Skull Valley has been used historically for domestic and agricultural purposes and some wells yield up to 225 L/min (60 gal/min) of flow. These uses are expected to continue at the same rates of withdrawal that have occurred for the past several decades. The planned groundwater withdrawals for the proposed PFSF would not adversely impact other groundwater users in Skull Valley during construction and operation or after decommissioning of the site.

6.3.3 Air Quality

Cumulative air quality impacts have been obtained by including existing emissions sources and background pollutant concentrations into the analyses presented in Sections 4.3.1 and 5.3. These cumulative impacts are considered to be small; hence, no further evaluation of cumulative impacts is necessary.

No other large construction projects are planned for the Reservation or the immediately surrounding area during the most intense period of construction (Phase 1) of the proposed facility, and no other appreciable sources of air pollution in the area appear to be “reasonably foreseeable” during that period. Subsequent phases of construction would produce much less fugitive dust than would Phase 1. The computer-modeled concentrations of air pollutants included the effects of several additional large local sources that may appreciably influence concentrations near the proposed PFSF site, but might have relatively little influence on monitored concentrations at distant sites. These additional sources include Dugway Proving Ground and MagCorp at Rowley, as well as several smaller sources (e.g., Tooele Army Depot).

The largest contribution of the combined off-site sources to the modeled 24-hour PM-10 concentration expected on *any* day at *any* location within 10 km (6 miles) from the construction site is $10 \mu\text{g}/\text{m}^3$, at the receptor nearest to Dugway Proving Ground (i.e., the receptor farthest from the construction area in that direction). At that location, the maximum effects of site construction on 24-hour average PM-10 concentrations would be about equal to the maximum effects from Dugway Proving Ground. However, the maximum effects of site construction at that receptor would occur when the wind is from the north, when PM-10 from the Dugway Proving Ground would be transported southward, away from that receptor. Therefore, these impacts would not be additive or

cumulative. No NAAQS for particulate matter would be exceeded or closely approached, and cumulative impacts would be small.

As described in Section 5.3, rail line construction could occasionally produce moderate cumulative impacts to PM-10 levels on Interstate 80 due to the proximity of the construction site to the interstate. Mitigation measures have been identified in Section 5.3.4 that would reduce the amounts of fugitive dust emitted from the rail line and rail siding construction areas.

6.3.4 Ecological Resources

Vegetation. Constructing and operating the facility as proposed at Site A with the preferred transportation alternative of the new rail line would include clearing existing vegetation within Skull Valley. The OCA for the proposed PFSF would include about 330 ha (820 acres), and an additional 82 ha (202 acres) would be used for the access road right-of-way. Of this total area, only 94 ha (232 acres) would be cleared. About 57 ha (140 acres) of that area would remain cleared for the life of the facility, a 28 ha (68 acres) fire barrier would be planted with crested wheatgrass, and the remaining cleared area [about 10 ha (24 acres)] would be planted with native vegetation following construction.

Construction of the new rail line, the preferred transportation alternative, would require clearing vegetation and grading soil from a total of 314 ha (776 acres) to reach the preferred site (Site A). For this option, approximately 63 ha (155 acres) of desert shrub/grass vegetation would remain cleared for the life of the PFSF, and the remaining cleared area [251 ha (621 acres)] would be replanted with primarily native vegetation following construction.

Thus, the total land cleared for the project as proposed, including the Skunk Ridge rail corridor to Site A, would be 408 ha (1,008 acres), less than 0.4 percent of the land area of Skull Valley. Of the area cleared, only 120 ha (295 acres), about 0.1 percent of the land area of Skull Valley, would remain cleared for the life of the project; the rest would be revegetated with native plants or, in the fire barrier area, planted with crested wheatgrass. The maximum area to be used for the project under this alternative would be about 730 ha (1,800 acres) for the OCA, the access road, and the area cleared for the rail corridor. This amounts to less than 0.7 percent of the area of Skull Valley.

Past activities have had a large impact on native vegetation in Skull Valley. The valley consists of approximately 108,400 ha (271,000 acres) of primarily undeveloped, but relatively disturbed land (see Section 3.4.). Little definitive information is available on its original vegetation. Historical ecological studies, based primarily on anecdotal accounts of early travelers, settlers, and explorers, have shown, however, that marked changes have occurred in the native vegetation of Utah valleys since settlement (Christensen and Hutchinson 1965). Significant vegetation changes occurred from 1859 to 1961 in the Cedar, Rush, and Skull valleys of the Bonneville Basin of Utah (Cottam 1961a and 1961b, cited in Christensen and Hutchinson 1965). Within twenty years of settlement the original desert grasses had been largely replaced by shrubs such as big sagebrush and shadscale. Following those initial changes, junipers began invading those shrub communities. Today, except for vast areas dominated by the recently introduced annual cheatgrass, grass is rarely conspicuous as a dominant in any of these habitats.

Much of the original change in vegetation from grass to shrubs is attributed to overgrazing (Christensen and Hutchinson 1965). Wildfires in conjunction with unrestricted livestock grazing were

likely required for the conversion of areas to dominance by weedy annuals like cheatgrass (BLM 1988a, 1988b, 1990; Sparks et al. 1990).

Because the native vegetation in Skull Valley has already been substantially altered by past actions, cumulative impacts on native vegetation from the proposed alternative with a rail line when added to past actions are large. However, the proposed alternative would provide only a small contribution to the existing large impacts on native vegetation resulting from the historical impacts of overgrazing and wildfires. In addition, incorporating measures to revegetate some areas disturbed by the proposed project with native species would reduce the impact of the project and provide a small positive benefit.

Wildlife. The maximum area affected by the project could be 652 ha (1,620 acres). While the construction of the rail line and the fencing of the proposed PFSF could contribute to habitat (or ecosystem) fragmentation, the impacts are expected to be small because (1) the loss of habitat represents less than 0.6 percent of the available habitat in Skull Valley, (2) no wildlife species exclusively use only one portion of Skull Valley, and (3) there are no distinct migration or seasonal use patterns for the wildlife in Skull Valley. With no new developments planned for the foreseeable future in Skull Valley, cumulative impacts to wildlife are expected to be small.

Perennial/ephemeral streams and aquatic resources. Because there are only a few existing facilities in Skull Valley and there are no other major facilities planned, cumulative impacts on aquatic resources would be limited to those identified for this proposed action, which are small.

Wetlands. In general, wetlands in Tooele County are in poor condition because of heavy use by livestock, wildlife, and recreationists (BLM 1983). In order to improve the condition of wetlands in northern Skull Valley, BLM prepared the Horseshoe Springs HMP (BLM 1992a). Implementation of this HMP is protecting wetlands and improving their condition. As the proposed action would have only a small impact on wetlands, it would not add cumulative impacts to wetlands in the valley.

Threatened and endangered species and other species of special concern. Wildfires or inadvertent trampling in Skull Valley are the future activities most likely to impact Pohl's milkvetch, the only plant of special concern in the valley (see Section 4.4.2). Pohl's milkvetch has been threatened by past wildland fires and cheatgrass expansions within the greasewood communities in Skull Valley (BLM 1998c). In particular, future human activity near Hickman Knolls (where Pohl's milkvetch has been found) or on land south of the Reservation (where Pohl's milkvetch is more common) would have the potential for small impacts (Kass 1998a) to this plant species. The potential exists for suitable habitat in Skull Valley for this species to be burned or damaged by wildfires. The loss of more of the greasewood community would reduce the moisture, shade, and shelter needed by the plants. However, if wildfires are suppressed near the proposed facility or along the rail line, there would be a small positive cumulative impact on this species.

Because the size of the proposed project is very small when compared to the size of Skull Valley, the cumulative impacts upon Federally and State-listed wildlife species are expected to be small.

6.3.5 Socioeconomics and Community Resources

There are no known or planned activities in Skull Valley that could produce additional impacts to socioeconomic and community resources near the proposed site. However, both of the local

transportation routes (i.e., from Skunk Ridge and Timpie) involve rail transfer points located in areas that may be used in the future for similar expansion (e.g., for other waste management activities in Tooele County's Interstate 80 Planning District). Given that the residential and infrastructure options for employees at the proposed site are similar to those for all other activities in Tooele County (i.e., live in and commute from Rush Valley or Tooele Valley), the potential for cumulative impacts to socioeconomic and community resources does exist.

6.3.6 Cultural Resources

The construction and operation of the proposed PFSF, including transportation aspects, at Skull Valley will create a moderate impact to one resource listed on the NRHP and only minor adverse impacts to other cultural resources, primarily due to the low number of known resources in the proposed project areas (see Sections 4.6 and 5.6). Additional recording and documentation of part of the Hastings Cutoff Trail in the proposed rail corridor would be beneficial in expanding knowledge of this significant historic property. There are no other proposed actions in the area that would induce a cumulative impact on cultural resources in Skull Valley. Therefore, the staff finds that the cumulative impact to cultural resources is of small significance based on the low number of resource properties affected, and the availability of accepted mitigation measures to reduce the severity of any impact on affected resources.

6.3.7 Human Health Impacts

According to Skull Valley Band and Tooele County officials, there are no other known private or public actions under consideration in Skull Valley. Therefore, there is no potential for cumulative effects on worker or public health, beyond what has been described for the proposed action in Section 6.1.7. These impacts have been determined to be small.

Cumulative effects on members of the public due to the presence of radioactive materials in Skull Valley include the effects of the proposed facility, in addition to effects that result from other known sources of radiation and pollution in the region. There are no foreseeable projects that would add substantially to the radiation environment in Skull Valley.

The nearest resident is about 3.2 km (2 miles) distant from the proposed facility and could receive a maximum dose of 0.024 mrem/yr. This is about 0.008 percent of the radiation dose due to natural background radiation in the United States (see Table 3.18). Such small radiation doses can be received just by traveling from sea level to a few hundred feet of elevation, by moving to a different part of the United States, or by choosing one building material over another (such as stone vs. wood) (NCRP 1987b). In other words, a dose of 0.024 mrem/yr is well below the variability associated with the natural radiation environment in which humans live.

As reported in Section 5.7, the risk of latent cancer fatalities for SNF shipments through Salt Lake County to the proposed PFSF would be no higher than 0.0025 per year. The Envirocare Facility west of Skull Valley accepts low-level radioactive wastes for disposal. Some of this radioactive material may pass through Salt Lake County, contributing to radiation exposures and cancer risks to county residents. In addition, some radioactive materials may pass through Utah on the way to disposal at DOE's Nevada Test Site or elsewhere. The staff has adopted health risk estimates from a recent EIS (NRC 1996 or NUREG-1437, Addendum 1) as a bounding estimate of the other sources of radiation exposure that may contribute to cumulative health impacts. Addendum 1 reports a

combined cancer risk estimate of 13 LCFs resulting from over 350,000 radioactive waste shipments through Clark County, Nevada, over a 40-year period (about 0.33 LCF/yr). As explained in Addendum 1, the number of shipments is substantially overestimated for Clark County and would be an extreme overestimate for Salt Lake County. However, if one adds the Addendum 1 estimate of 0.33 LCF/yr to the LCF reported in Section 5.7 (i.e., 0.0025), the cumulative LCF/yr remains almost 7,000 times lower than the effective cancer risk from all causes for Salt Lake County (i.e., 2,300). Consequently, the staff concludes that the cumulative health effects of SNF and other radioactive waste transport on the population of Utah is small.

6.3.8 Other Impacts

Noise. Noise does not add linearly; rather, cumulative effects would be dominated by the loudest audible source. Noise impacts during construction and operation of the proposed PFSF and new rail line have already been evaluated in the earlier discussion of impacts in Sections 4.8 and 5.8. Moderate temporary impacts would result from the substantial increase in road traffic along Skull Valley Road, particularly during the first phase of construction. Other noise impacts are likely to be small.

Scenic qualities. Construction and operation of the proposed PFSF at Site A combined with construction and operation of the rail line and siding would change the scenic quality of Skull Valley by introducing an industrial presence into a largely undeveloped landscape. The staff concludes that the combined visual impact would be moderate because the visual presence of the proposed facilities would alter noticeably the scenic qualities of Skull Valley as viewed from recreational areas, residential areas, Skull Valley Road, and Interstate 80 (see Section 6.1.8.2).

In addition to this alternative, other past, present and reasonably foreseeable actions have and will continue to affect scenic quality in Skull Valley. Other past and present actions include residential, commercial, and ranch development in and around the Reservation, construction and use of Skull Valley Road and the power distribution line along the road, construction and use of Interstate 80, and construction and operation of other industrial facilities (such as the MAGCorp plant near Rowley, Utah) that are visible from Interstate 80.

The staff estimates the magnitude of existing visual impacts from these past and present actions to be moderate because they have altered noticeably the scenic qualities of Skull Valley and the surrounding area. The staff is not aware of any other future actions that would contribute to cumulative impacts to visual resources.

Together, the impacts of the proposed action and the impacts of these other past and present actions would continue to change the scenic quality of Skull Valley from an undeveloped rural area into an area with residential, commercial, transportation, and industrial developments. The staff concludes that these changes would represent a moderate cumulative impact because they would combine to alter noticeably the scenic qualities of Skull Valley and the surrounding area.

Recreation. There are no known or planned activities in Skull Valley that could produce additional adverse impacts to recreational resources and opportunities near the proposed PFSF site. The BLM is currently reviewing lands it administers near the Cedar Mountains WSA for wilderness

characteristics (see Section 3.8.3), but any future determination on the inclusion of those areas to the Cedar Mountains WSA would likely have beneficial impacts to recreation. If BLM does expand the Cedar Mountains WSA to include these properties, the cumulative effect would likely improve rather than impair recreational resources and opportunities on the west side of Skull Valley.

6.3.9 Environmental Justice

A potential consideration under environmental justice is the possibility that, while the environmental impact of a facility is not large, the impact on a minority or low-income community is disproportionately adverse because the group: (1) is being currently affected by other facilities or environmental problems that leave them disproportionately vulnerable to adverse environmental effects of the facility in question; (2) has been disproportionately affected by past projects or environmental practices, leaving them more vulnerable now; or (3) has language barriers, geographical immobility, or inherently poorer access to health care or other response mechanisms than the majority population, again leaving them more vulnerable to any environmental or socioeconomic impact. In this case, the expected radiological impact from operation of proposed PFSF is small for even the most exposed individual for either normal operations or credible accidents; thus, the enhanced vulnerability concern does not apply because very little risk is added by the proposed PFSF facility.

Physicians in Tooele are on contract to the Indian Health Service to provide first-tier medical services to the Skull Valley Band, but inquiries to the Indian Health Service produced no data on the Skull Valley Band. Inquiries by NRC and PFS to the Utah Department of Health also did not produce any data that identified any specific health problems in the Skull Valley Band. It was not possible to identify any unusual incidences of diseases in Tooele County, the smallest area for which published health information is available. While the incidence of chronic diseases is slightly higher in Tooele County than in Utah as a whole, it is not clear that the difference is statistically significant, nor is the income and ethnicity of individuals with chronic diseases available. While sufficient data do not exist that show any unique health conditions among the Skull Valley Band, there is also no evidence that the proposed PFSF would compound any health problems of nearby residents or visitors in the Skull Valley vicinity.

Summary. Examination of the various environmental pathways by which low income and minority populations could be disproportionately affected reveals no disproportionate high and adverse impacts from construction or normal operations. There are also no credible accident scenarios by which such impacts could take place. Thus, the effect of the proposed PFSF on environmental justice concerns through direct environmental pathways is small. When considering past, present, and foreseeable future actions, the impacts from the proposed PFSF would add little to the indirect impacts and cumulative impacts and are considered to be small.

6.4 Unavoidable Adverse Environmental Impacts

There are certain limited potentially unavoidable adverse impacts associated with the construction and operation of the proposed PFSF, as well as with the transportation of SNF. Such impacts are discussed in this section.

6.4.1 Geology, Minerals, and Soils

Unavoidable soil erosion from both wind and water will occur during construction activities. Dust control and stormwater control measures, as well as revegetation of disturbed areas, will minimize soil erosion. With these mitigations, the resulting levels of soil erosion by wind and water should be similar to the levels that currently exist in Skull Valley.

Disturbing the existing soil profile and using aggregate (e.g., crushed stone) in construction are unavoidable adverse impacts of the proposed action. However, only a very small amount of soil is permanently lost in project construction, and aggregate materials could be recovered after decommissioning. Economic mineral resource-located beneath the proposed PFSF and the new rail line would be unavailable for exploitation during the life of the project. These impacts, however, would be small.

6.4.2 Water Resources

Unavoidable impacts to surface water may be related to increased stormwater runoff from the areas of the proposed PFSF due to the presence of impervious surfaces (i.e., buildings, asphalt, concrete). Such runoff would be controlled under general permits (see Sections 1.6.2.1 and 1.6.2.3). Also, the possible presence of motor oils and greases from construction or operations equipment could result in a degraded quality of this runoff compared to what exists now.

No unavoidable adverse impacts on groundwater are expected as a result of construction or operation of the proposed disposal facility, because of the relatively small quantities of water to be used from newly drilled on-site wells. Withdrawal of water from these new wells is not expected to impact other users of groundwater in Skull Valley.

6.4.3 Air Quality

Unavoidable impacts to air quality from construction of the proposed facility would be associated with earth-moving activities that create airborne dust. Through the use of adequate control measures, such as treating disturbed areas with water or chemical surfactants for dust suppression, the potential impacts to air quality due to suspended particulate matter would be minimized. The impact on regional air quality is expected to be small.

6.4.4 Ecological Resources

The project as proposed would require the commitment of 57 ha (140 acres) for the main facility and 63 ha (155 acres) for a new rail line for a total of about 120 ha (295 acres) for the life of the facility (i.e., up to 40 years). The loss of wildlife habitat in these areas would be unavoidable. In areas lost for the life of the project, the existing vegetation, with the exception of invasive annuals such as cheatgrass, would not be restored unless revegetation is undertaken as part of non radiological decommissioning and closure of the PFSF as required by the lease. Plant species composition and diversity would be altered because of this disruption of the natural vegetation and subsequent revegetation. Although the removal of habitat would be temporary, the natural diversity of plant species may not recover. If revegetation is to be part of non-radiological decommissioning and

closure, a plan, similar to those described in Sections 4.4 and 5.4, would need to be developed. Such a plan would be consistent with the then-latest guidance on the matter.

Currently, this land is sparsely vegetated and supports low numbers of wildlife. Small amounts of animal habitat would be unavoidably lost in the disturbed areas during construction activities. It is likely that less mobile species would be lost during construction.

Areas that are to be fenced, including the 40-ha (99-acre) restricted-access area, would be unavoidably lost for use by certain wildlife species such as mule deer and pronghorn antelope for as long as the fences are up.

6.4.5 Socioeconomic and Community Resources

Because of the size of the regional employment force and the relatively small number of workers to be employed on the proposed project, no adverse socioeconomic impacts are expected from the project. Likewise, there should be no adverse impacts to the local infrastructure, with the possible exception of traffic on Skull Valley Road. Increased traffic would accompany construction and operation of the proposed facility.

Construction and operation of the proposed PFSF should have no adverse impact on the use of off-site land near the site on the Reservation. However, construction of a new rail line from Skunk Ridge would impact the land use of the proposed right-of-way corridor, including grazing areas, until such time as the rail line were removed and the land revegetated.

6.4.6 Cultural Resources

Based on cultural resources field inventories of all proposed project areas in Skull Valley, two historic sites may be affected by construction of the Skunk Ridge rail line. One of these may be avoided by construction activities; however, the Hastings Cutoff Trail would be directly affected as the historic trail transects the rail corridor. Thus, a segment of the trail that currently retains a high degree of physical integrity will be destroyed. In addition to the impact to the physical integrity of the trail, the presence of the rail line will be an intrusion on the place and setting of the historic trail in an area that still evokes an impression of the original cultural landscape of this western migration route.

6.4.7 Human Health Impacts

The impacts of radiation emitted from SNF casks during transport to or storage at the proposed PFSF cannot be avoided. However, the radiation doses that would occur as a result of the proposed action are well below NRC regulatory limits, and represent a small fraction of the existing background levels of radiation.

6.4.8 Other Impacts

6.4.8.1 Noise

Increased noise will accompany construction and operation of the proposed facility; however, the anticipated noise levels will not create adverse impacts. Increased traffic on Skull Valley Road due

to workers at the facility, as well as noise from the train(s) moving SNF to the proposed facility from the new Skunk Ridge siding, would generate additional noise. The increase noise would be audible to residents along Skull Valley Road.

6.4.8.2 Scenic Qualities

Because the proposed facility differs from the rural and undeveloped nature of the surrounding landscape, visual impacts to the scenic qualities of Skull Valley would be unavoidable during construction and operation. After the SNF has been removed to a permanent repository, the impacts to the scenic qualities of Skull Valley could be eliminated by removing all facilities and recontouring the landscape to its original condition.

6.4.8.3 Recreation

There should be no unavoidable adverse impacts to recreation associated with the construction and operation of the proposed project at the proposed site. Construction and operation of the proposed rail line from Skunk Ridge to the proposed site may have some limited adverse impacts to certain recreational values found on the BLM-administered land (e.g., solitude and some OHV activities) but would not adversely affect others (e.g., camping and bird watching). In addition, although the proposed rail line right-of-way does not cross any of the land parcels recently reinventoried for wilderness characteristics, construction and operation of the proposed rail line could change recreational opportunities on adjacent and nearby public lands.

6.4.9 Environmental Justice

The principal unavoidable impact could come through the loss of any species and habitat that may be of subsistence or cultural importance to Native Americans. Depending on what species are affected, this could be of some significance to some of the more traditional Skull Valley Band members. However, the species and habitat found on the site and in the rail corridor have not been identified as unique; therefore, the impact would be small.

6.5 Relationship Between Short-Term Uses of the Environment and Long-Term Productivity

Short-term uses of the environment for the proposed project include (1) using a portion of the Reservation for the interim storage of SNF, (2) using a portion of the land in Skull Valley for a new rail line, and (3) obtaining railbed ballast and construction aggregate from local quarries. These short-term uses of the environment would provide an option to help ensure the continued operation of existing U.S. nuclear power plants.

The proposed action would produce favorable short-term effects on the local economy, including that of the Skull Valley Band. Under the proposed action, economic productivity of the land on the Reservation would be enhanced far above its current use.

The land in Skull Valley that would be occupied by the proposed project is presently undeveloped rangeland. A limited amount of grazing currently occurs on this land, and the land to be used by the

proposed PFSF and the new rail line does not have any other current agricultural or productive uses. The use of this rangeland for the proposed project would reduce the amount of such land available in Skull Valley, but the reduction would not be a significant amount. The proposed project would replace this rangeland with an industrial development which has its own infrastructure in the form of a new rail line. The addition of such infrastructure to Skull Valley would increase the productivity and usefulness of the land far above its current use for limited cattle grazing and could potentially increase the opportunities for further economic development for the Skull Valley Band and/or other unused portions of Skull Valley.

The proposed PFSF is an interim facility and would not be a permanent addition to Skull Valley. Upon termination of the lease or the NRC license, the PFSF would be decommissioned, and the property could be reused for other purposes. Likewise, the new rail line could either be removed or reused for other purposes. Therefore, there would be no long-term commitment of the proposed project areas in Skull Valley, and there would be no impairment to the long-term productivity of these areas.

Any increases in suspended particulates and exposure to ionizing radiation associated with construction, operation, and closure of the proposed facility would be short-term and would cease upon termination of the license for the facility.

6.6 Irreversible and Irretrievable Commitment of Resources

The land upon which the proposed facility, the new access road, and the new rail line (or new ITF) would be constructed would be lost to other uses until closure of the facility upon the termination of its license (i.e., 20 to 40 years in the future). The commitment of lands involves the loss of plant and animal resources, as well as habitats that currently exist, or that could exist, on those lands. In addition, certain wildlife species may not be able to use areas to be fenced as part of the project.

Approximately 94 ha (232 acres) of vegetation and wildlife habitat on the Reservation would be cleared for the life of the proposed project. An additional amount of land [up to 63 ha (155 acres) more] could be cleared of vegetation for the life of the project to accommodate a new rail siding and new rail transportation corridor from Skunk Ridge to the proposed site of the facility. The affected areas could be revegetated and returned to current use by wildlife upon termination of the license for the facility.

Construction and operation activities would consume materials that may not be recyclable or recoverable. The portion of excavated soil used to create soil cement would be irretrievably lost. Construction, operation, and closure of the site would require a commitment of human and financial resources. Commitments of machinery, vehicles, and fossil fuels would also be required during the project; however, none of the aforementioned resources are in short supply in the vicinity of the proposed project.

Water would be consumed for dust suppression during construction and during the on-site manufacture of the concrete storage pads and casks. Water used during the project (except for water chemically bound in the manufacture of concrete) would eventually recycle to the atmosphere for distribution elsewhere. Water obtained from aquifers would eventually be replaced by natural recharge processes.

No known commercially valuable mineral resources are expected to be affected by the project; although access to any such resources that may exist beneath the site of the proposed facility and the proposed Skunk Ridge transportation corridor would be precluded until the facility is decommissioned at the termination of its license.

6.7 Potential Impacts of the No-Action Alternative

According to PFS's ER (PFS/ER 2000), not building the proposed PFSF could have the following consequences:

- increased probability of shutdown of operating reactors before operating license expiration due to the lack of adequate SNF storage capacity, with the attendant loss of electrical power generation for that area or region,
- delays in reactor decommissioning activities due to the inability to remove SNF from sites in a timely manner, resulting in continued expenditures associated with SNF storage at permanently shutdown reactors,
- the need to construct additional at-reactor ISFSIs to handle the anticipated need for SNF storage.

The no-action alternative is included in this DEIS to provide a baseline for comparison with the proposed action. Under the no-action alternative, no PFSF and no transportation facilities would be constructed in Skull Valley. The impacts described in Chapters 4 and 5 of this DEIS would not occur, and Skull Valley would remain as it is today (see Chapter 3). No lease payments would accrue to the Skull Valley Band, and their economic situation would likewise continue as it is today.

While the no-action alternative would avoid any impacts on Skull Valley due to the construction and operation of the PFSF, it could lead to impacts at other locations. If the proposed PFSF is not built in Skull Valley, SNF would continue to accumulate at nuclear power plants. Based on current DOE plans, removal of SNF from nuclear power plant sites would not begin until 2010, when DOE anticipates that the permanent geological repository will be ready to begin receiving SNF. Most SNF is currently being stored in SNF pools that were built along with the reactor systems. Some power reactor licensees have expanded their pool storage capacity to accommodate the accumulated SNF. A few have built at-reactor ISFSIs to store their SNF in dry casks using a technology similar to what is proposed for Skull Valley (see Figure 1.5). Licensees that cannot expand their SNF storage capacity at their sites may have to terminate operations when their available SNF storage capacity is filled.

As described in Section 2.2.5, the no-action alternative would allow for only two options in regard to the continued storage of SNF: (1) either the capacity of at-reactor SNF storage facilities would have to be expanded or new at-reactor SNF storage facilities would have to be constructed or (2) the operating reactors would have to shut down when their existing storage capacity is reached. The potential environmental impacts of the first of these two options are examined in this section. While the cooperating agencies recognize that many environmental impacts could result from shutting down nuclear power reactors, a full evaluation of these potential environmental impacts (such as generation of additional air pollution from replacement sources of electricity) is beyond the scope of this DEIS. The local and regional impacts resulting from the loss of electric generating capacity for

shutdown reactors, including the potential for increased electricity prices, are speculative and are not addressed in detail in this DEIS.

The NRC has examined, in support of other agency actions, the environmental impacts of at-reactor ISFSIs. In support of its Waste Confidence Decision, NRC examined the environmental impacts of the operation of ISFSIs built at operating nuclear power plant sites. The Commission has made a general determination that, if necessary, spent fuel generated in any reactor can be stored without significant environmental impacts for at least 30 years beyond the licensed life for operation of that reactor at on-site or off-site ISFSIs (see 10 CFR 51.23 and 49 Fed. Reg. 34688; Aug. 31, 1984). The NRC has reviewed the Waste Confidence Decision twice [i.e., in 1990 (55 Fed. Reg. 38474; Sept. 18, 1990) and in 1999 (64 Fed. Reg. 68005; Dec. 6, 1999)] since it was first issued, and in both cases, the Commission basically reaffirmed the findings of the original decision.

On July 18, 1990, the NRC published a final rule on “Storage of Spent Nuclear Fuel in NRC-Approved Storage Casks at Nuclear Power Reactor Sites” (55 Fed. Reg. 29190, July 18, 1990), and issued a general license for storage of SNF at reactor sites (10 CFR 72.210). The environmental impacts of SNF storage at reactor sites were also addressed in an environmental assessment which tiered from the “Final Generic Environmental Impact Statement on the Handling and Storage of Spent Light Water Reactor Fuel,” NUREG-0575, August 1979, and the “Environmental Assessment for 10 CFR Part 72 ‘Requirements for the Independent Storage of Spent Fuel and High-Level Radioactive Waste,’” NUREG-1092, August 1984. The accompanying finding of no significant impact states that:

[T]he Commission concludes that this proposed rulemaking, entitled “Storage of Spent Nuclear Fuel in NRC-Approved Storage Casks at Nuclear Power Reactor Sites” will not have a significant incremental effect on the quality of the human environment.

Eight existing at-reactor ISFSIs with specific licenses issued by NRC were previously identified in Chapter 1 (see Figure 1.5). For all eight ISFSIs, an environmental assessment was completed and a finding of no significant impact was reached. For the no-action alternative with respect to the proposed PFSF, the NRC staff assumes that at-reactor ISFSIs would be constructed at reactor sites where additional storage capacity is needed and where physical constraints, such as available land at the reactor site, do not preclude the construction or operation of an ISFSI. The staff also assumes that the design, construction, and operation of future ISFSIs would be similar to that of existing ISFSIs. While a detailed examination of each reactor site where an at-reactor ISFSI could be built has not been completed, the staff does not expect, as a general matter, based on the previous NRC studies discussed above, that the construction and operation of future at-reactor ISFSIs would result in significant environmental impacts. No further site-specific studies or evaluations have been undertaken in this DEIS in regard to the provision of additional at-reactor storage.

The following discussion includes impact assessments for future at-reactor ISFSIs prepared by the staff as part of the current environmental review. Because of the large number of operating reactor sites, as well as their individual site characteristics, the discussion below is limited to broad observations about the nuclear power industry.

6.7.1 Geology, Minerals, and Soils

Because activities associated with the no-action alternative would occur at existing nuclear power reactor sites, there should be no significant impacts to geology, soils, or on-site minerals beyond the impacts already discussed in existing NEPA documentation for those sites.

The construction or expansion of at-reactor storage facilities would involve the use of construction materials, such as sand, aggregate, and gravel. These resources are generally not in short supply in the United States, and any impacts from their use is expected to be small.

6.7.2 Water Resources

Potential impacts to surface water and groundwater from the no-action alternative could arise from the increased use of these resources during construction and operation of new or expanded at-reactor storage facilities. These impacts are expected to be small based on the previous and current use of such resources for power reactor operations (i.e., considering existing reactor cooling and wet pool storage requirements) and existing on-site storage activities.

6.7.3 Air Quality

For construction activities related to the expansion or construction of new SNF storage at existing reactor sites, there could be air quality impacts associated with site preparation and earth-moving activities. These impacts at an individual reactor site would likely be less than the impacts for the proposed project in Skull Valley because the amount of at-reactor land to be disturbed should be smaller than the 40 ha (99 acres) proposed for Skull Valley, and, consequently, less suspended dust would be generated. However, if the distance to the nearest downwind site boundary and/or to the nearest resident for the new at-reactor storage facilities were less than the distances for the proposed site in Skull Valley, then any reduction in impacts as a result of generating a smaller amount of fugitive dust emissions could potentially be offset by higher airborne concentrations that would be associated with the shorter distances.

6.7.4 Ecological Resources

Potential impacts on ecological resources from the expansion or creation of at-reactor SNF storage facilities could arise from activities associated with disturbance of existing plant and animal habitats. Where storage would be expanded only within the owner-controlled area of existing reactor sites, impacts would most likely be small because of the existing industrial characteristics of these areas. If new SNF storage facilities were developed in the vicinity of existing storage structures and minimal surface clearing were required, impacts to native vegetation, wildlife, wetlands, or species of special concern would be expected to be small.

6.7.5 Socioeconomic and Community Resources

For expansion or construction of new SNF storage facilities at existing reactors, there could be some socioeconomic impacts associated with the size of the workforce, land-use, and local traffic near existing nuclear plants. The potential effects would depend on the site and the type of expansion. Because the amount of additional SNF storage needed at any one reactor would be far less than the

40,000 MTU proposed for Skull Valley, the potential reactor-specific impacts should be smaller than those identified for Skull Valley.

Land use impacts could arise at those existing reactor sites where grazing, recreational activities, and other public access activities occur within the boundaries of the owner-controlled area. Where such activities occur, and where these same areas might be used for the expanded or newly constructed storage facilities, some adverse impacts could occur, but are not expected to be significant.

6.7.6 Cultural Resources

Expansion of SNF storage capacity at existing nuclear reactor sites could have some potential for impacts to cultural resources, if construction activities occur on previously undisturbed acreage at those facilities, but are not expected to be significant.

6.7.7 Human Health Impacts

Both public and occupational doses are associated with routine operations (including SNF storage) at a typical operating nuclear facility. Additional on-site storage of SNF would add a small incremental amount to the existing doses. Incremental increases in doses to workers would be monitored and would be administratively controlled so as not to exceed regulatory limits. Because the combined doses would still comply with NRC regulatory limits, there would be no significant impact to members of the public from the storage of additional fuel.

6.7.8 Other Impacts

6.7.8.1 Noise

Noise would accompany any expansion or new construction of at-reactor SNF storage facilities. The magnitude and extent of noise impacts would be highly site-specific. In general, construction and operation of an at-reactor ISFSI would have noise impacts similar to those from the operational activities at the reactor itself. Hence, any incremental noise impacts would be expected to be small.

6.7.8.2 Scenic Qualities

Creation or expansion of at-reactor SNF storage facilities could cause changes in the visual features of the reactor site. If the new storage facilities were built adjacent to the much larger nuclear reactor facilities, the visual effects would be insignificant because they would not be readily apparent to viewers of the reactor site.

6.7.8.3 Recreation

As discussed in Section 4.2.5, there may be reactor sites where recreational activities occur within the OCA. Where such activities occur, and where these same areas might be used for the expanded or newly constructed storage facilities, some adverse impacts to recreation could occur, but are not expected to be significant.

6.7.9 Environmental Justice

The potential impacts under the no-action alternative would result from the options of expanding SNF storage capability at existing nuclear reactor sites or the cessation of power reactor operations once existing storage capacity has been reached.

In the event that new on-site storage facilities are constructed, such construction and operations would occur within the boundaries of the existing power plants. Because these construction activities are expected generally to result in small impacts (see Section 4.3) to the environment, there should be no disproportionately high and adverse impacts to minority and low-income populations and therefore no environmental justice concern. The additional, incremental radiation that would emanate into the environment from these new storage facilities would comply with NRC dose limits, so no significant offsite impacts and no environmental justice concerns would be expected from radiation.

The primary impact from the premature cessation of power reactor operations would be the potential for increased electricity prices due to more costly storage and/or premature closure of nuclear plants. Such impacts do not necessarily fall more heavily on low-income persons, but these individuals may be less able to meet the increases in costs (which may or may not be significant). If necessary, such impacts could be mitigated with “lifetime rates,” or other forms of financial assistance.